

# RAPTORS OF THE WORLD

---



James Ferguson-Lees and David A. Christie

Illustrated by Kim Franklin, David Mead and Philip Burton

# CONTENTS

<u>LIST OF SPECIES</u>	<u>6</u>
<u>PREFACE</u>	<u>14</u>
<u>ACKNOWLEDGEMENTS</u>	<u>15</u>
<u>INTRODUCTION</u>	<u>17</u>
<u>USING THIS BOOK</u>	<u>20</u>
<u>ORDERS OF RAPTOR POPULATION SIZES</u>	<u>26</u>
<u>RAPTOR TOPOGRAPHY</u>	<u>27</u>
<u>MEASURING LENGTHS AND WINGSPANS OF RAPTORS</u>	<u>31</u>
<u>SEX AND AGE DIFFERENCES IN SIZES AND SHAPES OF RAPTORS</u>	<u>35</u>
<u>IDENTIFYING RAPTORS</u>	<u>40</u>
<u>RAPTOR MIGRATION</u>	<u>44</u>
<u>RAPTOR MOULT PATTERNS AND AGE CRITERIA</u> <i>by Carl Edelstam</i>	<u>50</u>
<u>RAPTOR VISION, HEARING AND OLFACTION</u> <i>by Carl Edelstam</i>	<u>54</u>
<u>RAPTOR PLUMAGES AND EXTERNAL STRUCTURE</u> <i>by Carl Edelstam</i>	<u>57</u>
<u>TAXONOMY, SEQUENCE AND NOMENCLATURE OF RAPTORS</u>	<u>69</u>
<u>ENGLISH NAMES OF RAPTORS</u>	<u>76</u>
<u>COLOUR PLATES</u>	<u>80</u>
<u>SYSTEMATIC SECTION</u>	<u>305</u>
<u>BIBLIOGRAPHY</u>	<u>926</u>
<u>INDEX</u>	<u>981</u>

# LIST OF SPECIES

Superscript numbers mark adjacent forms considered allospecies; the older or oldest name (which thus designates the superspecies) is also asterisked. Some taxa, which may be full species but are treated here as races, are included below the species to which they refer. The subdivisions of Accipitridae (a huge family of 240 species), *Herpetotheridae* and *Falconidae* are artificial groupings simply to help identification.

		Page	Plate
<b>Order CICONIIFORMES</b>			
<b>Family CATHARTIDAE (New World vultures)</b>			
1	Black Vulture	<i>Coragyps atratus</i>	305 4
2	Turkey Vulture	<i>Cathartes aura</i>	306 4
3	Lesser Yellow-headed Vulture	<i>Cathartes burrovianus</i> <sup>1*</sup>	309 4
4	Greater Yellow-headed Vulture	<i>Cathartes melambrotus</i> <sup>2</sup>	310 4
5	California Condor	<i>Gymnogyps californianus</i>	311 5
6	Andean Condor	<i>Vultur gryphus</i>	313 5
7	King Vulture	<i>Sarcoramphus papa</i>	315 5
<b>Order ACCIPITRIFORMES</b>			
<b>Family PANDIONIDAE (Osprey)</b>			
8	Osprey	<i>Pandion haliaetus</i>	317 6
<b>Family ACCIPITRIDAE</b>			
<b>a: bazas, honey-buzzards, atypical kites</b>			
9	African Cuckoo-hawk	<i>Aviceda cuculoides</i> <sup>3</sup>	321 8
10	Madagascar Cuckoo-hawk	<i>Aviceda madagascariensis</i> <sup>2*</sup>	323 8
11	Jerdon's Baza	<i>Aviceda jerdoni</i> <sup>2</sup>	324 9
12	Pacific Baza	<i>Aviceda subcristata</i> <sup>4</sup>	325 9
13	Black Baza	<i>Aviceda leuphotes</i>	328 9
14	Grey-headed Kite	<i>Leptodon cayanensis</i> <sup>3*</sup>	329 13
14a	Forbes's Kite	<i>Leptodon forbesi</i> <sup>2</sup>	331 —
15	Hook-billed Kite	<i>Chondrohierax uncinatus</i>	332 12
	inc. <i>wilsonii</i> of Cuba		
16	Long-tailed Honey-buzzard	<i>Henicopernis longicauda</i> <sup>1*</sup>	334 10
17	Black Honey-buzzard	<i>Henicopernis infuscatus</i> <sup>2</sup>	335 10
18	Western Honey-buzzard	<i>Pernis apivorus</i> <sup>1*</sup>	336 6
19	Eastern Honey-buzzard	<i>Pernis ptilorhyncus</i> <sup>2</sup>	342 10
	inc. <i>orientalis</i> of eastern Asia, and <i>torquatus</i> of the Sunda region		
20	Barred Honey-buzzard	<i>Pernis celebensis</i>	346 10
	inc. <i>steerei</i> of the Philippines		
21	Swallow-tailed Kite	<i>Elanoides forficatus</i>	348 14
<b>b: Bat-hawk</b>			
22	Bat-hawk	<i>Macheiramphus alcinus</i>	350 8
<b>c: white-tailed kites</b>			
23	Pearl Kite	<i>Gampsonyx swainsonii</i>	352 14
24	White-tailed Kite	<i>Elanus leucurus</i> <sup>1</sup>	353 12
25	Black-shouldered Kite	<i>Elanus caeruleus</i> <sup>2*</sup>	355 7
26	Australian Black-shouldered Kite	<i>Elanus axillaris</i> <sup>3</sup>	359 11
27	Letter-winged Kite	<i>Elanus scriptus</i>	360 11

28	Scissor-tailed Kite	<i>Chelectinia riocourii</i>	362	8
<b>d: true kites</b>				
29	Snail Kite	<i>Rostrhamus sociabilis</i>	363	12
30	Slender-billed Kite	<i>Rostrhamus hamatus</i>	365	12
31	Double-toothed Kite	<i>Harpagus bidentatus</i>	366	14
32	Rufous-thighed Kite	<i>Harpagus diodon</i>	368	14
33	Plumbeous Kite	<i>Ictinia plumbea</i> <sup>1*</sup>	369	13
34	Mississippi Kite	<i>Ictinia mississippiensis</i> <sup>2</sup>	370	13
35	Square-tailed Kite	<i>Lophoictinia isura</i>	372	11
36	Black-breasted Kite	<i>Hamirostra melanosternon</i>	374	11
37	Red Kite	<i>Milvus milvus</i> <sup>3*</sup>	376	7
38	Cape Verde Kite	<i>Milvus fasciicauda</i> <sup>2</sup>	379	7
39	Black Kite	<i>Milvus migrans</i>	381	7
	inc. <i>lineatus</i> of eastern Asia, and <i>aegyptius</i> of sub-Saharan Africa			
40	Whistling Kite	<i>Haliastur sphenurus</i>	386	15
41	Brahminy Kite	<i>Haliastur indus</i>	387	15
<b>e: fish-eagles and fishing-eagles</b>				
42	White-bellied Fish-eagle	<i>Haliaeetus leucogaster</i> <sup>1*</sup>	390	15
43	Sanford's Fish-eagle	<i>Haliaeetus sanfordi</i> <sup>2</sup>	393	15
44	African Fish-eagle	<i>Haliaeetus vocifer</i> <sup>1*</sup>	394	16
45	Madagascar Fish-eagle	<i>Haliaeetus vociferoides</i> <sup>2</sup>	396	16
46	Pallas's Fish-eagle	<i>Haliaeetus leucoryphus</i>	398	18
47	Bald Eagle	<i>Haliaeetus leucocephalus</i> <sup>1</sup>	400	17
48	White-tailed Fish-eagle	<i>Haliaeetus albicilla</i> <sup>2*</sup>	402	17
49	Steller's Fish-eagle	<i>Haliaeetus pelagicus</i>	406	17
50	Lesser Fishing-eagle	<i>Ichthyophaga humilis</i>	408	18
51	Grey-headed Fishing-eagle	<i>Ichthyophaga ichthyaetus</i>	410	18
<b>f: Palmnut Vulture</b>				
52	Palmnut Vulture	<i>Gypohierax angolensis</i>	411	16
<b>g: Lammergeier</b>				
53	Lammergeier	<i>Gypaetus barbatus</i>	413	19
<b>h: true Old World vultures</b>				
54	Egyptian Vulture	<i>Neophron percnopterus</i>	417	19
55	Hooded Vulture	<i>Necrosyrtes monachus</i>	421	19
56	White-rumped Vulture	<i>Gyps bengalensis</i> <sup>1*</sup>	422	21
57	White-backed Vulture	<i>Gyps africanus</i> <sup>2</sup>	425	22
58	Long-billed Vulture	<i>Gyps indicus</i> <sup>2</sup>	426	21
	inc. <i>tenuirostris</i> of the Himalayas and South-East Asia			
59	Rüppell's Vulture	<i>Gyps rueppellii</i> <sup>2</sup>	428	22
60	Himalayan Vulture	<i>Gyps himalayensis</i> <sup>3</sup>	430	20
61	Griffon Vulture	<i>Gyps fulvus</i> <sup>4*</sup>	431	20
62	Cape Vulture	<i>Gyps coprotheres</i> <sup>5</sup>	435	22
63	Monk Vulture	<i>Aegypius monachus</i>	437	20
64	Lappet-faced Vulture	<i>Aegypius tracheliotus</i>	439	23
65	White-headed Vulture	<i>Aegypius occipitalis</i>	442	23
66	Red-headed Vulture	<i>Aegypius calvus</i>	443	21

**i: snake-eagles, serpent-eagles**

67	Short-toed Snake-eagle	<i>Circaetus gallicus</i> <sup>1*</sup>	445	24
68	Beaudouin's Snake-eagle	<i>Circaetus beaudouini</i> <sup>2</sup>	448	24
69	Black-chested Snake-eagle	<i>Circaetus pectoralis</i> <sup>3</sup>	450	24
70	Brown Snake-eagle	<i>Circaetus cinereus</i>	451	24
71	East African (Banded) Snake-eagle	<i>Circaetus fasciolatus</i>	452	25
72	(Smaller) Banded Snake-eagle	<i>Circaetus cinerascens</i>	454	25
73	Bateleur	<i>Terathopius ecaudatus</i>	455	23
74	Crested Serpent-eagle	<i>Spilornis cheela</i> <sup>1*</sup>	457	26
75	Andaman Serpent-eagle	<i>Spilornis elgini</i> <sup>2</sup>	460	27
76	Central Nicobar Serpent-eagle	<i>Spilornis minimus</i> <sup>3</sup>	461	26
77	Great Nicobar Serpent-eagle	<i>Spilornis klossi</i> <sup>4</sup>	462	27
78	Simeulue Serpent-eagle	<i>Spilornis abbotti</i> <sup>5</sup>	463	26
79	Nias Serpent-eagle	<i>Spilornis asturinus</i> <sup>6</sup>	463	26
80	Mentawai Serpent-eagle	<i>Spilornis sipora</i> <sup>7</sup>	464	26
81	Natuna Serpent-eagle	<i>Spilornis natunensis</i> <sup>8</sup>	465	26
82	Kinabalu Serpent-eagle	<i>Spilornis kinabaluensis</i> <sup>9</sup>	466	26
83	Bawean Serpent-eagle	<i>Spilornis baweanus</i> <sup>10</sup>	467	26
84	Sulawesi Serpent-eagle	<i>Spilornis rufipectus</i> <sup>11</sup>	468	27
85	Philippine Serpent-eagle	<i>Spilornis holospilus</i> <sup>12</sup>	469	27
86	Ryukyu Serpent-eagle	<i>Spilornis perplexus</i> <sup>13</sup>	470	26
87	West African Serpent-eagle	<i>Dryotriorchis spectabilis</i>	471	25
88	Madagascar Serpent-eagle	<i>Eutriorchis astur</i>	472	28

**j: gymnogenes or harrier-hawks**

89	African Gymnogene	<i>Polyboroides typus</i> <sup>1</sup>	474	28
90	Madagascar Gymnogene	<i>Polyboroides radiatus</i> <sup>2*</sup>	476	28

**k: harriers**

91	Spotted Harrier	<i>Circus assimilis</i>	477	33
92	Black Harrier	<i>Circus maurus</i>	479	30
93	Hen Harrier	<i>Circus cyaneus</i> <sup>1*</sup>	481	32
94	Northern Harrier	<i>Circus hudsonius</i> <sup>2</sup>	483	29
95	Cinereous Harrier	<i>Circus cinereus</i> <sup>3</sup>	486	29
96	Pallid Harrier	<i>Circus macrourus</i>	488	31
97	Pied Harrier	<i>Circus melanoleucus</i>	491	33
98	Montagu's Harrier	<i>Circus pygargus</i>	493	31
99	African Marsh Harrier	<i>Circus ranivorus</i> <sup>1</sup>	496	30
100	Northern Marsh Harrier inc. <i>spilonotus</i> of eastern Asia	<i>Circus aeruginosus</i> <sup>2</sup>	498	32
101	Australasian Marsh Harrier inc. <i>spilothorax</i> of New Guinea	<i>Circus approximans</i> <sup>3</sup>	503	33
102	Malagasy Marsh Harrier	<i>Circus maillardi</i> <sup>4</sup>	505	30
103	Long-winged Harrier	<i>Circus buffoni</i>	507	29

**l: chanting-goshawks**

104	Dark Chanting-goshawk	<i>Melierax metabates</i> <sup>1</sup>	509	34
105	Eastern Chanting-goshawk	<i>Melierax poliopterus</i> <sup>2</sup>	511	34
106	Pale Chanting-goshawk	<i>Melierax canorus</i> <sup>3</sup>	512	34

**m: Gabar Goshawk**

107	Gabar Goshawk	<i>Micronisus gabar</i>	514	34
-----	---------------	-------------------------	-----	----

**n: true accipiters**

108	Grey-bellied Goshawk	<i>Accipiter poliogaster</i>	516	51
109	Crested Goshawk	<i>Accipiter trivirgatus</i> <sup>1*</sup>	518	41
110	Sulawesi Crested Goshawk	<i>Accipiter griseiceps</i> <sup>2</sup>	520	41
111	African Goshawk	<i>Accipiter tachiro</i>	521	37
	inc. <i>macroscelides</i> and <i>toussenelii</i> of West and Central Africa			
112	Chestnut-flanked Sparrowhawk	<i>Accipiter castanilius</i>	523	36
113	Shikra	<i>Accipiter badius</i>	524	35
114	Levant Sparrowhawk	<i>Accipiter brevipes</i>	528	39
115	Chinese Sparrowhawk	<i>Accipiter soloensis</i>	531	40
116	Nicobar Sparrowhawk	<i>Accipiter butleri</i>	533	41
117	Frances's Sparrowhawk	<i>Accipiter francesii</i>	535	38
	inc. <i>grivaudi</i> , <i>pusillus</i> and <i>brutus</i> of the Comoros			
118	Spot-tailed Sparrowhawk	<i>Accipiter trinotatus</i>	536	42
119	Brown Goshawk	<i>Accipiter fasciatus</i>	537	48
120	Grey Goshawk	<i>Accipiter novaehollandiae</i> <sup>1*</sup>	540	47
121	Varied Goshawk	<i>Accipiter hiogaster</i> <sup>2</sup>	541	47
	inc. <i>pulchellus</i> of the Solomons, and <i>natalis</i> of Christmas Island			
122	Grey-throated Goshawk	<i>Accipiter griseogularis</i> <sup>2</sup>	545	47
123	Black-mantled Goshawk	<i>Accipiter melanochlamys</i> <sup>1</sup>	546	44
124	Pied Goshawk	<i>Accipiter albogularis</i> <sup>2</sup>	547	46
125	Fiji Goshawk	<i>Accipiter rufitorques</i> <sup>2</sup>	549	43
126	New Caledonia Goshawk	<i>Accipiter haplochrous</i> <sup>4</sup>	550	45
127	Moluccan Goshawk	<i>Accipiter henicogrammus</i>	551	43
128	Slaty-backed Sparrowhawk	<i>Accipiter lutoschistaceus</i>	552	45
129	Imitator Sparrowhawk	<i>Accipiter imitator</i>	554	46
130	Grey-headed Goshawk	<i>Accipiter poliocephalus</i> <sup>1*</sup>	555	44
131	New Britain Goshawk	<i>Accipiter princeps</i> <sup>2</sup>	556	45
132	Tiny Hawk	<i>Accipiter superciliosus</i> <sup>1*</sup>	557	51
133	Semicollared Hawk	<i>Accipiter collaris</i> <sup>2</sup>	559	51
134	Red-thighed Sparrowhawk	<i>Accipiter erythropus</i> <sup>1</sup>	560	36
135	Little Sparrowhawk	<i>Accipiter minullus</i> <sup>2*</sup>	561	36
136	Japanese Sparrowhawk	<i>Accipiter gularis</i>	563	40
137	Besra	<i>Accipiter virgatus</i>	565	40
138	Sulawesi Small Sparrowhawk	<i>Accipiter nanus</i>	568	42
139	Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i> <sup>1*</sup>	569	48
140	New Britain Sparrowhawk	<i>Accipiter brachyurus</i> <sup>2</sup>	571	45
141	Moluccan Sparrowhawk	<i>Accipiter erythrauchen</i> <sup>3</sup>	572	43
142	Vinous-breasted Sparrowhawk	<i>Accipiter rhodogaster</i>	573	42
143	Ovambo Sparrowhawk	<i>Accipiter ovampensis</i>	575	35
144	Madagascar Sparrowhawk	<i>Accipiter madagascariensis</i>	577	38
145	Northern Sparrowhawk	<i>Accipiter nisus</i> <sup>1*</sup>	578	39
146	Rufous-breasted Sparrowhawk	<i>Accipiter rufiventris</i> <sup>2</sup>	581	35
147	Sharp-shinned Hawk	<i>Accipiter striatus</i>	583	49
	inc. White-breasted <i>chionogaster</i> , Plain-breasted <i>ventralis</i> , and Rufous-thighed <i>erythronemius</i> of Central and South America			
148	Bicoloured Hawk	<i>Accipiter bicolor</i> <sup>1*</sup>	586	50
	inc. <i>chilensis</i> of Chile and Argentina			
149	Cooper's Hawk	<i>Accipiter cooperii</i> <sup>2</sup>	588	49
150	Gundlach's Hawk	<i>Accipiter gundlachi</i> <sup>2</sup>	590	50

151	Great Sparrowhawk	<i>Accipiter melanoleucus</i>	592	37
152	Henst's Goshawk	<i>Accipiter henstii</i>	594	38
153	Northern Goshawk	<i>Accipiter gentilis</i>	595	39
154	Meyer's Goshawk	<i>Accipiter meyerianus</i>	600	46
<b>o: hawks of uncertain position</b>				
155	Bürgers's Hawk	<i>Erythrotriorchis buergeri</i> <sup>1</sup>	602	44
156	Red Hawk	<i>Erythrotriorchis radiatus</i> <sup>2*</sup>	603	48
157	Doria's Hawk	<i>Megatriorchis doriae</i>	605	44
158	Long-tailed Hawk	<i>Urotriorchis macrourus</i>	606	52
159	Grasshopper Buzzard-hawk	<i>Butastur rufipennis</i> <sup>1</sup>	608	52
160	Rufous-winged Buzzard-hawk	<i>Butastur liventer</i> <sup>2</sup>	609	53
161	White-eyed Buzzard-hawk	<i>Butastur teesa</i> <sup>3</sup>	610	53
162	Grey-faced Buzzard-hawk	<i>Butastur indicus</i> <sup>4*</sup>	612	53
163	Lizard-buzzard	<i>Kaupifalco monogrammicus</i>	613	52
164	Crane-hawk	<i>Geranoospiza caerulescens</i>	615	54
<b>p: true hawks and buzzards</b>				
165	Slate-coloured Hawk	<i>Leucopternis schistacea</i> <sup>1*</sup>	617	54
166	Plumbeous Hawk	<i>Leucopternis plumbea</i> <sup>2</sup>	618	54
167	Barred Hawk	<i>Leucopternis princeps</i>	619	54
168	Black-faced Hawk	<i>Leucopternis melanops</i> <sup>2*</sup>	620	55
169	White-browed Hawk	<i>Leucopternis kuhl</i> <sup>2</sup>	621	55
170	White-necked Hawk	<i>Leucopternis lacernulata</i>	622	55
171	Semiplumbeous Hawk	<i>Leucopternis semiplumbea</i>	623	55
172	White Hawk	<i>Leucopternis albicollis</i> <sup>1*</sup>	624	56
173	Grey-backed Hawk	<i>Leucopternis occidentalis</i> <sup>2</sup>	626	56
174	Mantled Hawk	<i>Leucopternis polionota</i> <sup>3</sup>	627	56
175	Rufous Crab-hawk	<i>Buteogallus aequinoctialis</i>	628	57
176	Mangrove Black Hawk	<i>Buteogallus subtilis</i> <sup>1</sup>	629	57
177	Common Black Hawk	<i>Buteogallus anthracinus</i> <sup>2*</sup>	631	57
178	Great Black Hawk	<i>Buteogallus urubitinga</i>	632	57
179	Savannah Hawk	<i>Buteogallus meridionalis</i>	635	59
180	Bay-winged Hawk	<i>Parabuteo unicinctus</i>	636	59
181	Black-collared Hawk	<i>Busarellus nigricollis</i>	639	59
182	Black-chested Eagle-buzzard	<i>Geranoaetus melanoleucus</i>	640	58
183	Black Solitary-eagle	<i>Harpyhaliaetus solitarius</i> <sup>1</sup>	642	58
184	Crowned Solitary-eagle	<i>Harpyhaliaetus coronatus</i> <sup>2*</sup>	644	58
185	Grey-lined Hawk	<i>Buteo nitidus</i>	646	65
	inc. Grey Hawk <i>plagiatus</i> of North and Central America			
186	Roadside Hawk	<i>Buteo magnirostris</i>	648	61
187	White-rumped Hawk	<i>Buteo leucorrhous</i>	650	61
188	Ridgway's Hawk	<i>Buteo ridgwayi</i> <sup>2</sup>	652	60
189	Red-shouldered Hawk	<i>Buteo lineatus</i> <sup>2*</sup>	653	67
190	Broad-winged Hawk	<i>Buteo platypterus</i>	656	65
191	Short-tailed Hawk	<i>Buteo brachyurus</i> <sup>1*</sup>	659	63
192	White-throated Hawk	<i>Buteo albigula</i> <sup>2</sup>	662	63
193	Swainson's Hawk	<i>Buteo swainsoni</i>	663	66
194	Galapagos Hawk	<i>Buteo galapagoensis</i> <sup>1</sup>	667	60
195	White-tailed Hawk	<i>Buteo albicaudatus</i> <sup>2*</sup>	668	64
196	Red-backed Hawk	<i>Buteo polyosoma</i> <sup>1*</sup>	671	62

197	Juan Fernández Hawk	<i>Buteo exsul</i>	673	62
198	Gurney's Hawk	<i>Buteo poecilochrous</i>	674	62
199	Zone-tailed Hawk	<i>Buteo albonotatus</i>	675	64
200	Hawaiian Hawk	<i>Buteo solitarius</i>	677	60
201	Rufous-tailed Hawk	<i>Buteo ventralis</i> <sup>1</sup>	679	63
202	Red-tailed Hawk	<i>Buteo jamaicensis</i> <sup>2*</sup>	681	67
203	Common Buzzard	<i>Buteo buteo</i> <sup>1*</sup>	686	69
	inc. Steppe Buzzard <i>vulpinus</i> of central Palearctic/Africa, and <i>japonicus</i> of east Asia			
204	Mountain Buzzard	<i>Buteo oreophilus</i> <sup>2</sup>	693	71
	inc. Forest Buzzard <i>trizonatus</i> of South Africa			
205	Madagascar Buzzard	<i>Buteo brachypterus</i> <sup>3</sup>	695	69
206	Long-legged Buzzard	<i>Buteo rufinus</i> <sup>1*</sup>	696	70
	inc. <i>cirtensis</i> of North Africa			
207	Upland Buzzard	<i>Buteo hemilasius</i> <sup>2</sup>	700	68
208	Ferruginous Hawk	<i>Buteo regalis</i>	702	66
209	Rough-legged Buzzard	<i>Buteo lagopus</i>	704	68
210	Red-necked Buzzard	<i>Buteo auguralis</i>	710	70
211	Jackal Buzzard	<i>Buteo rufofuscus</i> <sup>1*</sup>	712	71
212	Augur Buzzard	<i>Buteo augur</i> <sup>2</sup>	713	71
	inc. Archer's Buzzard <i>archeri</i> of Somalia			
<b>q: harpy eagles</b>				
213	Crested Eagle	<i>Morphnus guianensis</i>	715	72
214	Harpy Eagle	<i>Harpia harpyja</i>	717	72
215	New Guinea Eagle	<i>Harpyopsis novaeguineae</i>	720	74
216	Philippine Eagle	<i>Pithecophaga jefferyi</i>	721	74
<b>r: Indian Black Eagle</b>				
217	Indian Black Eagle	<i>Ictinaetus malayensis</i>	722	74
<b>s: Aquila eagles</b>				
218	Lesser Spotted Eagle	<i>Aquila pomarina</i>	724	81
219	Greater Spotted Eagle	<i>Aquila clanga</i>	727	81
220	Tawny Eagle	<i>Aquila rapax</i> <sup>1*</sup>	730	80
	inc. <i>vinthiana</i> of India			
221	Steppe Eagle	<i>Aquila nipalensis</i> <sup>2</sup>	733	80
	inc. <i>orientalis</i> of central Eurasia			
222	Imperial Eagle	<i>Aquila heliaca</i>	737	79
	inc. <i>adalberti</i> of the Iberian Peninsula			
223	Gurney's Eagle	<i>Aquila gurneyi</i>	740	78
224	Golden Eagle	<i>Aquila chrysaetos</i>	742	79
225	Wedge-tailed Eagle	<i>Aquila audax</i>	746	78
226	Verreaux's Eagle	<i>Aquila verreauxii</i>	748	82
<b>t: hawk eagles</b>				
227	Bonelli's Eagle	<i>Hieraaetus fasciatus</i> <sup>1*</sup>	750	83
228	African Hawk Eagle	<i>Hieraaetus spilogaster</i> <sup>2</sup>	753	83
229	Wahlberg's Eagle	<i>Hieraaetus wahlbergi</i>	755	82
230	Booted Eagle	<i>Hieraaetus pennatus</i> <sup>1*</sup>	758	83
231	Little Eagle	<i>Hieraaetus morphnoides</i> <sup>2</sup>	761	78
232	Ayres's Hawk Eagle	<i>Hieraaetus ayresii</i>	763	84

233	Rufous-bellied Hawk Eagle	<i>Hieraaetus hienerii</i>	765	76
234	Black-and-white Hawk Eagle	<i>Spizaetor melanoleucus</i>	767	73
235	Long-crested Eagle	<i>Lophaetus occipitalis</i>	769	84
236	Cassin's Hawk Eagle	<i>Spizaetus africanus</i>	770	84
237	Changeable Hawk Eagle	<i>Spizaetus cirrhatus</i>	771	76
	inc. <i>limnaetus</i> of South-East Asia and <i>floris</i> of the Lesser Sundas			
238	Mountain Hawk Eagle	<i>Spizaetus nipalensis</i> <sup>1*</sup>	774	75
	inc. <i>orientalis</i> of Japan			
239	Javan Hawk Eagle	<i>Spizaetus bartelsi</i> <sup>2</sup>	776	77
240	Sulawesi Hawk Eagle	<i>Spizaetus lanceolatus</i> <sup>3</sup>	778	77
241	Philippine Hawk Eagle	<i>Spizaetus philippensis</i> <sup>4</sup>	779	77
242	Blyth's Hawk Eagle	<i>Spizaetus alboniger</i> <sup>5</sup>	781	75
243	Wallace's Hawk Eagle	<i>Spizaetus nanus</i>	783	75
244	Black Hawk Eagle	<i>Spizaetus tyrannus</i>	784	73
245	Ornate Hawk Eagle	<i>Spizaetus ornatus</i>	786	73
246	Crowned Hawk Eagle	<i>Stephanoaetus coronatus</i>	788	85
247	Isidor's Eagle	<i>Oroaetus isidori</i>	790	72
248	Martial Eagle	<i>Polemaetus bellicosus</i>	792	85

#### Order SAGITTARIIFORMES

##### Family SAGITTARIIDAE (Secretarybird)

249	Secretarybird	<i>Sagittarius serpentarius</i>	794	85
-----	---------------	---------------------------------	-----	----

#### Order FALCONIFORMES

##### Family DAPTRIIDAE (caracaras)

250	Black Caracara	<i>Daptrius ater</i>	796	88
251	Red-throated Caracara	<i>Daptrius americanus</i>	797	88
252	Carunculated Caracara	<i>Phalcoboenus carunculatus</i> <sup>1</sup>	798	86
253	Mountain Caracara	<i>Phalcoboenus megalopterus</i> <sup>2*</sup>	799	86
254	Darwin's Caracara	<i>Phalcoboenus albogularis</i> <sup>3</sup>	801	86
255	Forster's Caracara	<i>Phalcoboenus australis</i>	802	86
256	Crested Caracara	<i>Caracara plancus</i>	804	87
257	Yellow-headed Caracara	<i>Milvago chimachima</i> <sup>1*</sup>	806	87
258	Chimango Caracara	<i>Milvago chimango</i> <sup>2</sup>	808	87

##### Family HERPETOTHERIDAE

###### a: Spot-winged Falconet

259	Spot-winged Falconet	<i>Spizapteryx circumcinctus</i>	810	90
-----	----------------------	----------------------------------	-----	----

###### b: Laughing-falcon

260	Laughing-falcon	<i>Herpetotheres cachinnans</i>	811	88
-----	-----------------	---------------------------------	-----	----

###### c: forest-falcons

261	Barred Forest-falcon	<i>Micrastur ruficollis</i>	813	89
262	Lined Forest-falcon	<i>Micrastur gilvicollis</i> <sup>1*</sup>	815	89
263	Plumbeous Forest-falcon	<i>Micrastur plumbeus</i> <sup>2</sup>	817	89
264	Slaty-backed Forest-falcon	<i>Micrastur mirandollei</i>	818	89
265	Collared Forest-falcon	<i>Micrastur semitorquatus</i>	820	90
266	Buckley's Forest-falcon	<i>Micrastur buckleyi</i>	822	90

##### Family FALCONIDAE

###### a: pygmy-falcons, Old World falconets

267	African Pygmy-falcon	<i>Polihierax semitorquatus</i>	823	91
-----	----------------------	---------------------------------	-----	----

268	White-rumped Pygmy-falcon	<i>Polihierax insignis</i>	825	91
269	Collared Falconet	<i>Microhierax caerulescens</i> <sup>1*</sup>	826	92
270	Black-thighed Falconet	<i>Microhierax fringillarius</i> <sup>2</sup>	828	92
271	White-fronted Falconet	<i>Microhierax latifrons</i>	829	91
272	Philippine Falconet	<i>Microhierax erythrogenys</i>	830	92
273	Pied Falconet	<i>Microhierax melanoleucus</i>	831	92
<b>b: typical falcons</b>				
274	Brown Falcon	<i>Falco berigora</i>	832	103
275	Lesser Kestrel	<i>Falco naumanni</i>	834	94
276	American Kestrel	<i>Falco sparverius</i>	838	98
277	Common Kestrel	<i>Falco tinnunculus</i>	843	93
	inc. <i>neglectus</i> and <i>alexandri</i> of the Cape Verdes			
278	Malagasy Spotted Kestrel	<i>Falco newtoni</i> <sup>3</sup>	848	96
279	Mauritius Kestrel	<i>Falco punctatus</i> <sup>2*</sup>	849	96
280	Seychelles Kestrel	<i>Falco araea</i> <sup>3</sup>	851	96
281	Moluccan Kestrel	<i>Falco moluccensis</i> <sup>1</sup>	852	97
282	Australian Kestrel	<i>Falco cenchroides</i> <sup>2*</sup>	854	97
283	White-eyed Kestrel	<i>Falco rupicoloides</i>	855	94
284	Fox Kestrel	<i>Falco alopex</i>	857	94
285	Grey Kestrel	<i>Falco ardosiaceus</i>	858	95
286	Dickinson's Kestrel	<i>Falco dickinsoni</i>	860	95
287	Madagascar Barred Kestrel	<i>Falco zoniventris</i>	861	95
288	Red-headed Falcon	<i>Falco chicquera</i>	862	104
289	Western Red-footed Falcon	<i>Falco vespertinus</i> <sup>1*</sup>	864	99
290	Eastern Red-footed Falcon	<i>Falco amurensis</i> <sup>2</sup>	867	99
291	Eleonora's Falcon	<i>Falco eleonorae</i>	869	100
292	Sooty Falcon	<i>Falco concolor</i>	872	100
293	Aplomado Falcon	<i>Falco femoralis</i>	875	105
294	Merlin	<i>Falco columbarius</i>	877	106
295	Northern Hobby	<i>Falco subbuteo</i> <sup>1*</sup>	881	101
296	African Hobby	<i>Falco cuvieri</i> <sup>2</sup>	885	101
297	Oriental Hobby	<i>Falco severus</i> <sup>3</sup>	886	101
298	Australian Hobby	<i>Falco longipennis</i> <sup>4</sup>	888	102
299	Bat Falcon	<i>Falco rufigularis</i>	889	105
300	Grey Falcon	<i>Falco hypoleucos</i>	892	102
301	New Zealand Falcon	<i>Falco novaeseelandiae</i>	893	104
302	Black Falcon	<i>Falco subniger</i>	895	103
303	Prairie Falcon	<i>Falco mexicanus</i>	896	108
304	Laggar Falcon	<i>Falco jugger</i> <sup>3</sup>	898	107
305	Lanner Falcon	<i>Falco biarmicus</i> <sup>2*</sup>	899	107
306	Saker Falcon	<i>Falco cherrug</i> <sup>1*</sup>	903	108
307	Altai Falcon	<i>Falco altaicus</i> <sup>2</sup>	906	108
308	Gyr Falcon	<i>Falco rusticolus</i>	908	109
309	Peregrine Falcon	<i>Falco peregrinus</i> <sup>1*</sup>	911	111
310	Barbary Falcon	<i>Falco pelegrinoides</i> <sup>2</sup>	919	110
311	Orange-breasted Falcon	<i>Falco deivoleucus</i>	922	105
312	Taita Falcon	<i>Falco fasciinucha</i>	924	110

## PREFACE

Work on this book started in 1983, and so has been a major part of me for 18 years (exactly one quarter of my life). Some species have been written four or more times, and most at least two or three. The concept has also changed from that of a relatively slim volume with an allocated average of 550 words per species (which proved impossible) to what we hope is now a fairly comprehensive 'handbook' with about 1,800 words per species (some up to 6,000 or more). The reasons for what we have now included are made clear in the introductory chapters. Introductions to reference books are often hardly looked at, but we hope that everyone who uses this book will take the trouble to read these sections here carefully, not least because they raise subjects that affect the whole contents.

All the plates were originally to have been painted by Philip Burton, but he realised at an early stage that he could not cope with the task of producing on his own over 2,100 birds on 112 plates. Kim Franklin and David Mead were persuaded to take over about a half and a quarter of the total respectively; both were very diligent in checking their work against skins.

When the book was first planned, quite a few of the world's raptors were little known in the field, particularly in South America, Indonesia through to the Solomons, and, surprising as it may seem, Australia. In the cases of at least two species, there was still confusion over which plumage was the adult and which the juvenile. Then, as first drafts were being put together, and we were bemoaning the lack of information on so many species, the level of interest in raptors took off. Papers on their identification, migrations, breeding biology and distribution started to appear at the rate of, it seemed, one or more per issue in all of the world's wide range of ornithological journals; indeed, many publications devoted solely to raptors started up; and, not least, the World Working Group on Birds of Prey and Owls, launched in the early 1970s, began to produce bigger and better publications, under the editorship of B-U Meyburg and RD Chancellor, containing more and more papers about raptor studies worldwide.

Keeping up with all this information became a huge task, and in 1994 David Christie started to help by updating and revising my then existing 180-odd second drafts. He later took over the initial writing of 35, and seven were drafted by WS Clark and MJ Everett. All our texts have been through the mill so many times since that some bear little relation to the originals and we are not showing who initiated what. Even then, it has proved impossible to keep all species up to date: for some the literature searches ended in 1995 and for others in 1997, but for a proportion (including most of those that are endangered) they have been continued to the new millennium.

We hope that the book will be a useful source of reference to anyone and everyone interested in these magnificent birds. Several innovations are explained in the introductory chapters, but I should like to summarise a few here. (1) As reversed sexual size dimorphism (RSD) is such a significant feature of raptor morphology, we have tried to express the amounts by which males are smaller than females in two different ways, in the plate caption and in the third paragraph of each main text. (2) Although wingspans have been creeping into identification books over the past 25 years, some have been little more than inaccurate guesses, so we hope that their systematic and scientifically based use here will prove valuable. (3) As proportions are often more important than colours or patterns for identifying flying raptors, we have calculated the ratio of wingspan over total length for the adults (only) of every species, not because anyone can be expected to discriminate between, say, 2.2 and 2.3, but because there are often significant differences between genera and, indeed, some related species, and because we hope that these estimates will encourage observers to make a point of looking at shapes and proportions; note also the comments on differences in shape between adults and juveniles of the same species, brought out briefly in the headings to plates 1-3, and in many individual texts. (4) Bird distributions are obviously determined in part by habitat and food restrictions, but we have shown the latitudinal limits in every case because, being related to temperature and climate, they are far more important than those of longitude, which are more the results of accidents of evolution and paleogeography. (5) Importantly we believe, in conservation terms, we have attempted at least to categorise the world populations of every species by expressing them as orders of magnitude.

In conclusion, I want to thank Kim Franklin, David Mead and Philip Burton for their work on the plates, which, inevitably, because they cannot be so easily altered as text, do not always show the latest detail; to David Christie for joining me in bringing this book to fruition; and, above all, to my wife Karen for all the help, support and understanding she has given me over the book's 18 years gestation (two-thirds of our married life together).

UJF-L

## ACKNOWLEDGEMENTS

Many people have helped us over this book, but several stand out. First and foremost, apart from accepting our invitation to write his stimulating chapter on moult patterns, Carl Edelstam guided our own researches over some years into the ageing of immature raptor specimens in the Natural History Museum at Tring, UK, photographed skins and checked points for us in museums worldwide from New York to Singapore, discussed many taxonomic problems, read and commented on a number of texts, and often answered our queries by telephoning from his native Sweden. He became interested enough to write and submit his two further chapters, on raptor senses and plumages, which we were glad to include. Carl has been a veritable *éminence grise*.

The second special influence was David Noakes, who bears the major responsibility for all the wingspan figures. This may seem a relatively minor aspect, but, like others before us, we had despaired of being able to give accurate information on this important field scale until we established contact with him. As explained in 'Measuring lengths and wingspans', he has been amassing such data from many thousands of live and freshly dead examples of birds of all families, not just raptors, for 50 years and, as a result, has been able to define formulae for calculating the spans of many genera and individual species from standard wing measurements. He provided us with these formulae for many raptors and carefully checked all the wingspan ranges quoted opposite the plates.

Third, although dealing with but a single zoogeographical region, Stephen Debus has been a great strength in providing information on Australasian raptors. Raptor studies have increased enormously in many parts of the world since the late 1970s, and positively snowballed in Australia during the 1980s and 1990s. Stephen has commented on colour laser copies of several of DM's and KF's plates, drawn our attention regularly over the years to Australasian references (supplying photocopies of many of the examples), checked drafts of all the Australasian texts and maps, provided photographs and, not least, been a voluminous and conscientious correspondent. Two other raptor enthusiasts, Alan Kemp and Mark Pearman, read through and commented extensively on all the species endemic to the Afrotropical and Neotropical regions respectively.

This project has lasted for so long that early drafts of the plate captions, many of the species texts and several of the introductory chapters were produced on an old BBC computer which used 5<sup>1</sup>/<sub>2</sub>-inch disks. After a professional firm had tried, and failed, to convert these to the subsequent standard 3<sup>1</sup>/<sub>2</sub>-inch, Chris du Feu spent hours achieving just that and we are greatly in his debt. Others who helped with computer problems included Dr David Gibbons and Dr Peter Lack.

It is perhaps not usual to cite books in 'Acknowledgements', but three very different trail-blazers from different parts of the world - *Flight Identification of European Raptors* by RF Porter, Ian Willis, Steen Christensen & Bent Pors Nielsen (first edition 1974), *Birds of Prey of Southern Africa* by Peter Steyn & Graeme Arnott (1982), and *A Field Guide to Hawks of North America* by William S Clark & Brian K Wheeler (1987) have in their various ways also exerted a considerable influence on our project. So, too, has an earlier book based largely on museum work - *Geographical Differentiation in the Genus Accipiter* by Jan Wattel (1973) - which deals in detail with this largest single group of raptors.

From the more personal point of view, we are indebted to correspondence and discussion over the years with Richard Porter, Bill Clark, Hadoram Shirihai, Dick Forsman, and the late Leslie Brown, co-author with Dean Amadon of *Eagles, Hawks and Falcons of the World* (1968). Bill Clark also commented on several plates and some early texts, wrote the first drafts of four of the Nearctic texts and provided valuable data during a meeting in January 1990. Mike Everett also drafted three of the fish-eagle texts.

Others who have given exceptional help include Lars Svensson (Sweden) and Ian Wallace (UK), who both read various sections of text and provided invaluable suggestions, and Brian K Wheeler (USA), whose revision of the texts of several Nearctic species made a huge difference. Tim Inskipp (UK) took a great deal of trouble over questions of sequence and nomenclature, and commented on the relevant chapters. Karen Ferguson-Lees worked on the first outlines of the distribution maps, which were then twice revised by JF-L, before being finalised by Duncan Brooks.

Others checking particular texts or plates have included Brian J Coates (Papua New Guinea), Paul Castle, Simon Harrap, Robin Kahn, Dr Peter Lack, Roger Lovegrove and Dr Ian Newton (UK), John Schmitt (USA), and Will Duckworth and Ben Sheldon (UK); the last two were the first ornithologists to see a live Madagascar Serpent-eagle *Eutriorhis astur* since 1930. Tess Brickhill, Gregory Czechura, Elizabeth Notley, Penny and Jerry Olsen, and David Pepper-Edwards all supplied Stephen Debus with advance copies of unpublished Australian research for forwarding to us. Comparable help was given to us by Cornelius Hazevoet and George Sangster (Netherlands). Extremely useful comments on endemic raptors of the Cape Verde Islands were provided by the last two and, especially, by Dr Sabine Hille (Austria). Likewise, Dr Anita Gamauf (Austria) clarified details of the *Spizaetus* hawk eagles in the Philippines.

Valuable distribution and other data were provided by Dr Mark Brazil (for Japan), Chris Cook (for Korea), Dr Steve Goodman (for Borneo), Ed Mackrill (for the Balearic Islands) and Dr Paul Salaman (for the Neotropics), and distributional questions were answered by Dr John Ash (for Ethiopia), Tito Narosky (for Argentina), and Geoff and Hilary Welch (for Djibouti). Olivier Langrand arranged for us to be sent advance copies of the raptor texts and maps from his *A Guide to the Birds of Madagascar* (1990) before it was published, and BirdLife International kindly supplied us with drafts of the raptors sections of its *Threatened Birds of the World* (2000) some months before that book was published.

The first draft list of the orders of population size (see p. 26) were commented on by Dr Tom J Cade (USA), Dr Nigel Collar (UK) and Dr Bernd-U Meyburg (Germany), all of whom have special qualifications in this direction by reason of their positions in, respectively, the World Center for Birds of Prey, BirdLife International (formerly International Council for Bird Preservation), and the World Working Group on Birds of Prey and Owls. The generally few changes that each recommended have been included so far as possible, but the final responsibility for the figures used rests with IJF-L. Stephen Debus also specifically checked the orders of population size for Australasia.

In 1988, we published in various journals worldwide an appeal for photographs of species on which we needed extra plumage information. As a result, photographs were sent in by Richard Bonson (UK), Chris Steeman (Belgium), William S Clark (USA), John Colebrook-Robjent (UK), Dirk de Moes (Netherlands), David Griffin (UK), Stellan Hedgren (Sweden), Dr Alan Kemp (South Africa), Jaroslav Klapste (Australia), Olivier Langrand (France/Madagascar), Graham Madge (UK), RD Medland (Malawi), Dr Bernd-U Meyburg (Germany), Martin E Nicoll (Madagascar), Bent Pors Nielsen (Denmark), Bengt Olsson (Sweden), Bent Boggild Pedersen (Denmark), V Raurel (Germany), Peter Paul Schets (Netherlands), Tony Soper (UK), Peter Steyn (South Africa), Goran Susic (Yugoslavia), Simon Thompson (USA), Trey Todd (USA) and Dr Fridtjof Ziesemer (Germany).

Additional photographs at other times were provided by Stephen Debus (Australia), Carl Edelstam (Sweden), Dr CJ Brown (Namibia), Alan Harris (UK), John M Houlder (UK/Argentina), Paul Leader (Hong Kong), Andrew Moon (UK), Barry Taylor (South Africa) and Carlos Wotzkow (Cuba). Apart from the special help already acknowledged from the first two of these, Chris Brown supplied updated photocopies of the South African maps in Steyn & Arnott (1982); Barry Taylor helped in a variety of ways, particularly over 'clear-winged' Shikras *Accipiter badius* and Levant Sparrowhawks *A. brevipes*; Carlos Wotzkow gave us advance details of his discovery of the new subspecies of Gundlach's Hawk *Accipiter gundlachi* and provided much information from his studies of this species, once thought 'nearly or quite extinct'; and John Houlder generously made possible ten visits by IJF-L to South America.

Iain Bishop, Graham Cowles, Robert Prys-Jones and the staff of the British Museum (Natural History) – now known as The Natural History Museum – at Tring, UK, allowed us almost unlimited facilities over several years. Between us, we must have spent 500 days in the Museum in connection with this project. Special thanks for advice and help in the Museum are due to Peter Colston, Michael Walters, Jo Bailey, Mark Adams and, not least, the successive librarians, Ann Vale and FE ('Effie') Warr, who took great pains to track down particular references. Skins of certain species and races not available in the Natural History Museum were also kindly sent to Tring by Kees Roselaar from the Zoologisch Museum, Amsterdam, and by Mary LeCroy from the American Museum of Natural History, New York.

Countless people have provided data, answered queries, lent or donated books or supplied photocopies. To list them all here would be impossible, and for this we apologise, but their help has always been greatly appreciated.

Our special thanks are due to Christopher Helm and Jo Hemmings, who first proposed this book; and to various other past and present members of the staff at Christopher Helm/A & C Black Ltd, including Robert Kirk, Nigel Redman, Carolyn Burch, Ann Doolan, Alan Marshall and Darina Williams, who have helped and bullied us during its long gestation. The compilation of the list of references is a major task in a work of this kind, and Lynx Edicions saved an enormous amount of work by allowing us to have the bibliography from *Handbook of Birds of the World*, volume 2, on disk to use as a basis from which to add and subtract as we wished: the final compilation was, even then, a huge task which owes much to the help and input given by Marianne Taylor. Linda Birch, librarian of the Edward Grey Institute, gave much help over late queries.

Finally, we are particularly grateful to Julie Dando and Marc Dando of Fluke Art in Cornwall (UK), who laboured tirelessly to produce the final design and pagination of the book before the whole lot was sent to the printers. At very short notice, Marc also drew seven of the figures that appear in the introductory chapters.

# INTRODUCTION

Many bird species prey on other animals, both vertebrates and invertebrates, but the term 'birds of prey' has long been applied chiefly to the kites, vultures, hawks, eagles, falcons and their allies. Nowadays, the birds of this broad group are perhaps better known as 'raptors' or, further distinguishing these mainly daytime hunters from the completely unrelated and typically nocturnal owls (Strigiformes), they may be defined as the 'diurnal raptors' (though it should be added that some do forage at dusk or even at night).

The diurnal raptors were long combined within a single order, the Falconiformes, but in recent decades have tended to be divided into three orders and here are treated as four [Taxonomy, sequence and nomenclature, pp. 67–75]. By far the largest is the Accipitriformes, which includes the Osprey *Pandion haliaetus* and all the kites, fish-eagles, Old World vultures, snake-eagles, harriers, hawks, buzzards and true eagles; the caracaras, forest-falcons, pygmy-falcons, falconets and typical falcons stay in the Falconiformes; and the very distinct Secretarybird *Sagittarius serpentarius* is here placed on its own in the Sagittariiformes.

There remain the New World vultures, which were long separated as the Cathartiformes, but are now known from DNA-DNA hybridisation studies and earlier protein analyses to be quite unrelated to the other three orders and, in particular, to have no connection with the Old World vultures. Instead, they are close to the storks and, in the DNA-DNA classification of Sibley & Monroe (1990), are placed in the stork family (Ciconiidae); here, we have maintained their separate family, the Cathartidae, within the order Ciconiiformes that includes the storks. In a manner of speaking, the New World vultures are short-necked storks with a hooked bill and a more or less bare head, which with their carrion-eating habits, broad wings and gliding flight give them resemblances to the true vultures through evolutionary convergence. But, however they are treated taxonomically, they also continue to be thought of as raptors.

Many raptors are beautiful, others (such as most of the vultures) hardly so at close ranges, but almost all are majestic or spectacular in the air. They fascinated primitive cultures, and falconry is at least 4,000 years old. Nowadays, more people than ever before watch, identify and count birds of prey: the cry of 'raptor' will alert a group of birdwatchers in a way that nothing else does. A concentration of migrating birds of prey is an exhilarating sight, possibly equalled only by large flocks of pelicans (Pelecanidae) or storks in thermals.

Several major books on all the world's raptors have been published over the past three-quarters of a century. The pioneer was H Kirke Swann's (1924–45), followed 30 years later by, in quick succession, Mary Louise Grossman & John Hamlet's (1964) and Leslie Brown & Dean Amadon's (1968), and most recently, volume 2 of *Handbook of the Birds of the World* (del Hoyo *et al.* 1994): all are large or multiple volumes. On a less grand scale, Friedhelm Weick (1980), in collaboration with Leslie Brown, painted 1,144 perched species and subspecies of raptors on 40 plates, with summaries of distributions and measurements.

Other books entitled 'Birds of Prey' or 'Birds of Prey of the World' have ranged from simple overviews (e.g. Everett 1975) to discussions of biology, ecology and conservation (e.g. Brown 1976, Weidensaul 1996), and from the largely photographic (Mackenzie 1976) to the mainly artistic (Burton *et al.* 1989) with general texts of varying worth.

Important works dealing with two of the three most numerous and widespread genera are Jan Wattel's *Geographical Differentiation in the Genus Accipiter* (1973) and Tom J Cade's *The Falcons of the World* (1982), while *The Vultures of Africa* (Mundy *et al.* 1992) is a major monograph on eleven species. There has also been a variety of treatises on 'eagles' – a term too loosely used for several genera of mainly large and majestic raptors that are not particularly closely related ['English names', pp. 76–79] – such as those on fish-eagles *Haliaeetus* (Fischer 1970) and 'eagles' in general (e.g. Brown 1976, Fischer 1976). Migration [see also Raptor Migration, pp. 44–49] has received special treatment in the form of *The Migrations of Hawks* (Heintzelman 1975) and *Flight Strategies of Migrating Hawks* (Kerlinger 1989); and at the very end of the twentieth century these have been valuably supplemented by two notable works, *Raptor Migration in Israel and the Middle East* (Shirihai *et al.* 2000) and *Raptor Watch* (Zalles & Bildstein 2000), this last, subtitled *A global directory of raptor migration sites*, being the most comprehensive work yet published on the recorded numbers of migrating raptors at all known watchsites in all parts of the world.

Some twenty monographs on single species in English, German or Spanish have covered the Osprey, Red Kite *Milvus milvus*, African Fish-eagle *Haliaeetus vocifer*, Bald Eagle *H. leucocephalus*, White-tailed Fish-eagle *H. albicilla*, Lammergeier *Gypaetus barbatus*, Hen Harrier *Circus cyaneus* and related Northern (American) Harrier *C. hudsonius*, Montagu's Harrier *C. pygargus*, Northern Marsh Harrier *C. aeruginosus*, Northern Sparrowhawk *Accipiter nisus*, Northern Goshawk *A. gentilis*, Common Buzzard *Buteo buteo*, Golden Eagle *Aquila chrysaetos*, Verreaux's (Black) Eagle *A. verreauxii*, Common Kestrel *Falco tinnunculus*, Eleonora's Falcon *F. eleonora*, Northern Hobby *F. subbuteo*, Gyrfalcon *F. rusticolus*, and Peregrine Falcon *F. peregrinus*. References to these are given with the individual species.

None of the books so far mentioned is concerned primarily with field identification. In this respect, but only on a regional scale, new ground was broken by *Flight Identification of European Raptors* (Porter *et al.* 1974) and, in turn but each presented very differently, by *Birds of Prey of Southern Africa* (Steyn 1982) and *A Field Guide to Hawks of North America* (Clark & Wheeler 1987). In the Western Palearctic, these were followed by *Collins Guide to the Birds of Prey of Britain and Europe* (Génsbøl 1984) and, much more recently, by *The Raptors of Europe and the Middle East: a Handbook of Field Identification* (Forsman 1999) and *Field Guide to the Raptors of the Western Palearctic* (Clark & Schmitt 1999); in the Afrotropical region, by *Birds of Prey of Africa and its Islands* (Kemp & Kemp 1998); and in the Nearctic, by *Hawks in Flight* (Dunne *et al.* 1988), which concentrated on flight, shape and behaviour, and *A Photographic Guide to North American Raptors* (Wheeler & Clark 1995). The *Raptors of Australia* (Debus 1998) deals not only with identification, but also with conservation, especially of Australia's endemic species.

There are also long sections on raptors, including useful identification material, in Cramp & Simmons (1980), Brown *et al.* (1982), Palmer (1988) and Marchant & Higgins (1993), four great regional handbooks dealing with the avifaunas of the Western Palearctic, Africa, North America and Australasia.

Among various primarily photographic books that include valuable identification material in the form of, particularly, close-up flight photographs, and which often incorporate field observations, are *Eagle Days* (Steyn 1973) and *African Birds of Prey* (Pickford *et al.* 1989); *Hawks in Focus* (Cupper & Cupper 1981) and *Eagles, Hawks and Falcons of Australia* (Hollands 1984); *A Guide to Hawk Watching in North America* (Heintzelman 1979) and *Birds of Prey* (Mackenzie 1986); and Eric Hosking's *Birds of Prey of the World* (Hosking *et al.* 1987).

Against this background, is there a place for a new book on the birds of prey of the world? Yes, there is, and for a whole series of reasons. None of the previous world books is in any sense a true identification guide. Their illustrations are primarily of perched adults and, although Grossman & Hamlet used flight outlines throughout, these were generically standardised line-drawings, while Brown & Amadon's selective sketches of fliers were attempts to indicate pattern more than shape. The maps in both those books are out of date, as already are those in del Hoyo *et al.* Knowledge and recognition of raptors in general and of their flight identification in particular have advanced enormously over the last 25 to 30 years.

This book is the first one designed essentially as an identification guide to the raptors of the world, also illustrating major plumages and races, both perched and in flight. Between them, the authors are familiar in the field with almost 200 of the 313 species recognised here. The 112 plates show some 2,115 individual birds, of which 1,135 are in flight. Combined with the facing maps, for the first time on a world scale for any such large group, are orders of magnitude for the total populations of every species (justified by calculations in the main species texts).

Although Clark & Wheeler (1987), Debus (1998), Clark & Schmitt (1998) and some other recent books, such as Svensson *et al.* (1999), give accurate wingspans on a regional basis, the highly condensed identification notes opposite the plates here include the first serious attempt to publish valid wingspans (as well as lengths) for all the world's raptors based on long series of actual measurements of living and freshly dead birds, and on formulae calculated from those [Measuring lengths and wingspans, pp. 31–34]. The back-up text for each species is a comprehensive summary that should provide everything necessary for a basic understanding of its identification and distribution, including extensive information on how it may be distinguished from similar species that are likely to occur within the same areas in which it is found.

The subjects of reversed sexual dimorphism (RSD), moult and ageing, and migration, are all discussed in separate introductory chapters, because they relate directly to identification. So, too, are taxonomy and nomenclature. But there is no place here for treatises on the evolution of raptors, on the place of birds of prey in Man's culture, on falconry, or even on flight and aerodynamics. Some of the works listed above go thoroughly into these and other topics.

Conservation is now all-important for a group of birds that stand at the top of so many food-chains. Raptors have long suffered shooting and poisoning, but pesticides, habitat destruction and even innocent disturbance from an ever-growing and, in some countries, increasingly leisured and peripatetic human population have become dominant threats.

Birds in general are recognised as the most obvious indicators of the health of the environment and, because of their positions atop food-chains, raptors are especially important. High numbers and a good variety of birds of prey show that all is well, but, unfortunately, human disregard for their surroundings means that such regions are ever becoming fewer.

The whole question of raptor conservation has been the subject of a number of conferences and subsequent published proceedings, particularly in the 1980s, when they ranged from the specific (Cade *et al.* 1988 on Peregrine Falcon Populations) to covering the whole field of captive breeding and reintroduction (Garcelon & Roemer 1988 on Proceedings of the International Symposium on Raptor Reintroduction, 1985, which includes an extensive bibliography on the subject). It has also been a major feature of the

several conference proceedings of the World Working Group on Birds of Prey and Owls, especially *Raptor Conservation Today* (Meyburg & Chancellor 1994).

Perhaps surprisingly, no raptor species has actually become extinct since the Guadeloupe Caracara *Polyborus lutosus* in about 1900 (and even that is now sometimes regarded as having been only a race of Middle and South America's widespread Crested Caracara *P. plancus*), but several are, or have been, very close to the brink. The Madagascar Serpent-eagle *Eutriorchis astur* was not certainly recorded for over 50 years from 1930: a few have now been seen, found dead or even trapped alive since 1988, and clarification, in 1995, of the species' territorial call enabled its presence to be confirmed at several localities from where it was not previously known. Gundlach's Hawk *Accipiter gundlachi* and the Mauritius Kestrel *Falco punctatus* were both thought by Brown & Amadon to be on the verge of extinction in the 1960s, but the former, though admittedly very rare, still has a viable population in Cuba. Although it was touch and go with the kestrel – only two pairs were left in the wild in 1974 – captive breeding and ecological management from 1984 had raised the total to over 50 pairs and more than 200 birds by 1993, and by the turn of the century these figures had risen to, respectively, 145–200 and 500–800. Similarly, though on a much slower scale, the few remaining California Condors *Gymnogyps californianus* were taken into captivity in 1987 for breeding and a year later the number held was 40, including 26 which had been hatched in captivity, 13 from wild eggs and, latterly, another 13 from eggs produced in captivity; by 1991 the total was 52, and a year later the first two immatures were released into the wild; in 1993 as many as 15 chicks were hatched in captivity; by the end of 1998 the total population had reached 147, of which 97 were in captivity and 50 in the wild, the latter made up of 28 birds reintroduced in two areas of California and a further 22 released at two sites in northern Arizona.

Several countries have hawk breeding programmes and falconry centres, and many of the species now bred in captivity it would have been thought quite impossible to breed and rear successfully 25 years ago. As some of the small population figures quoted in this book will indicate, however, a number of raptors remain under serious threat; it is important that we go on learning as much as we can about them. Perhaps the rarest and most endangered now, if it still exists and if indeed it is a good species, is Forbes's Kite *Leptodon forbesi* in the rapidly dwindling forests of parts of one or, at most, two states of easternmost Brazil. Another, for very different reasons, is the Cape Verde Kite *Milvus fasciicauda*. Two further examples are Ridgway's Hawk *Buteo ridgwayi* of the Caribbean island of Hispaniola and the Philippine Eagle *Pithecophaga jefferyi*, both with current populations of no more than a few hundreds that are threatened by habitat loss and degradation, and by illegal persecution or hunting for food.

The literature on raptors seems to grow by the day. We have read a great deal over the decade and three-quarters that it has taken to produce this book, but there are bound to be oversights and omissions; moreover, several important works were published just after the deadline for our completion of most of the main texts and, unfortunately, it was not possible for their content to be taken into account. We shall be most grateful to learn of any errors or new information that may seem relevant, for incorporation into future editions. Please send any correspondence through the publishers.

If some parts of our text appear over-condensed, even complicated, it must be realised that raptor identification is in itself notoriously complex. Many species are shy and, particularly when perched, some are difficult to separate at anything but the closest ranges; others have odd-looking immature plumages. In flight, the shape and actions are all-important; even these may be altered by circumstances and weather conditions. But identification of birds of prey always presents a marvellous challenge. We hope that this book will help.

# USING THIS BOOK

This book, though bulkier than most bird guides, was originally intended for use in the field as well as for general reference. During its writing, however, its size has increased to the point where the practicalities of taking it into the field would render that rather improbable. It is, therefore, as an identification handbook and reference that the book's value may best be appreciated, though it is likely that some dedicated observers will use it at times as a field guide.

Following these preliminary chapters, the book has two main parts: plates, with facing distribution maps and highly condensed captions; and detailed species texts, with larger versions of the maps. The first three plates are introductory keys to genera, while the other 109 illustrate all (bar one) of the 313 species recognised here. Each detailed species text summarises distribution, identification and relevant biology. The aims and conventions of both parts and their components are set out below.

## PLATES: INTRODUCTORY KEYS TO GENERA

Although lone distant or briefly seen soaring pelicans (Pelecanidae) or storks (Ciconiidae), or single flying gulls (Laridae), cuckoos (Cuculidae), pigeons (Columbidae) or crows (Corvidae), can in some circumstances be mistaken momentarily for certain genera or species of birds of prey, most observers have little difficulty in recognising at once that a raptor is a raptor. Depending on the part of the world, it is then a question of determining whether it is a kite, vulture, harrier, accipiter, buteo, eagle, caracara, falcon or any of several other broad groupings ('Identifying raptors', pp. 40–43). To this end, plates 1–3 and their facing texts are designed as an introduction to the rest.

In this book, 313 species of diurnal birds of prey are divided into 78 genera in seven families of four orders [full list on pp. 6–13]. Plates 1–3 show representatives of all these 78 genera, each drawn to the scale quoted at the top of the facing page. Many genera contain few species, which are often fairly constant in shape, so that usually only one of each of those is illustrated here. But some of the largest genera (especially *Accipiter*, *Buteo* and *Falco*, which together account for well over a third of all raptors) are given two or three examples. The birds on these key plates are all in flight because, in general, that is how raptors are most often seen. Many are actually more difficult to identify when perched.

Each of the three introductory plates shows 26 of the genera, with the 'mainly larger' species on plate 1, an assortment of 'medium-sized' on plate 2, and the 'mainly smaller' on plate 3. But note that the distinctions between these size categories owe a certain amount to convenience of layout and the need to divide the total into three, so that some species on the 'mainly smaller' plate 3 are actually slightly bigger than others represented on the 'medium-sized' plate 2. It must also be emphasised that all the birds shown are males, and almost all are adults: many females are larger, while some juveniles have rather different proportions which are summarised by genera in the headings to each key plate [see also 'Sex and age differences in sizes and shapes', pp. 35–39].

At the top and bottom of each of these three plates are scale silhouettes of two characteristic raptors, Swainson's Hawk *Buteo swainsoni* (a highly migratory species of the Americas, relatively long-winged and slender but in general a typical buteo) and Black Kite *Mitrus migrans* (found throughout much of the Old World and arguably the most numerous raptor of all). To anyone with a moderate experience of birds of prey, these will give an idea of the relative sizes of the generic examples shown.

All but nine of the 78 raptor genera are confined either to the Americas (30) or to the Old World (39). The top sections of the key plates show peculiarly New World genera, and the bottom sections peculiarly Old World; the nine more cosmopolitan genera are represented in paler central strips. Thus, the observer needs to look at only the top or bottom two-thirds, depending on which side of the Pacific or Atlantic he or she is situated.

Apart from providing a broad key to the genera, with only the briefest indications of ranges of colours and sizes, plates 1–3 summarise the zoogeographical region(s) in which each genus is found and list the plates on which it is represented. The boundaries of the eight main zoogeographical regions (excluding Antarctica, where raptors are absent) are shown in fig. 1.

## PLATES

### Illustrations of species

Having decided, from plates 1–3 or from previous experience, to which genus or group of genera a raptor belongs, it is then a matter of turning to the plate or plates concerned.

This may be done from the cross-references in the captions facing the introductory plates, from the English or the scientific names in the species list (which includes plate numbers as well as text pages), from the index or, for more experienced observers, from a general knowledge of the sequence in which birds of prey are placed as an indication of their likely affinities.

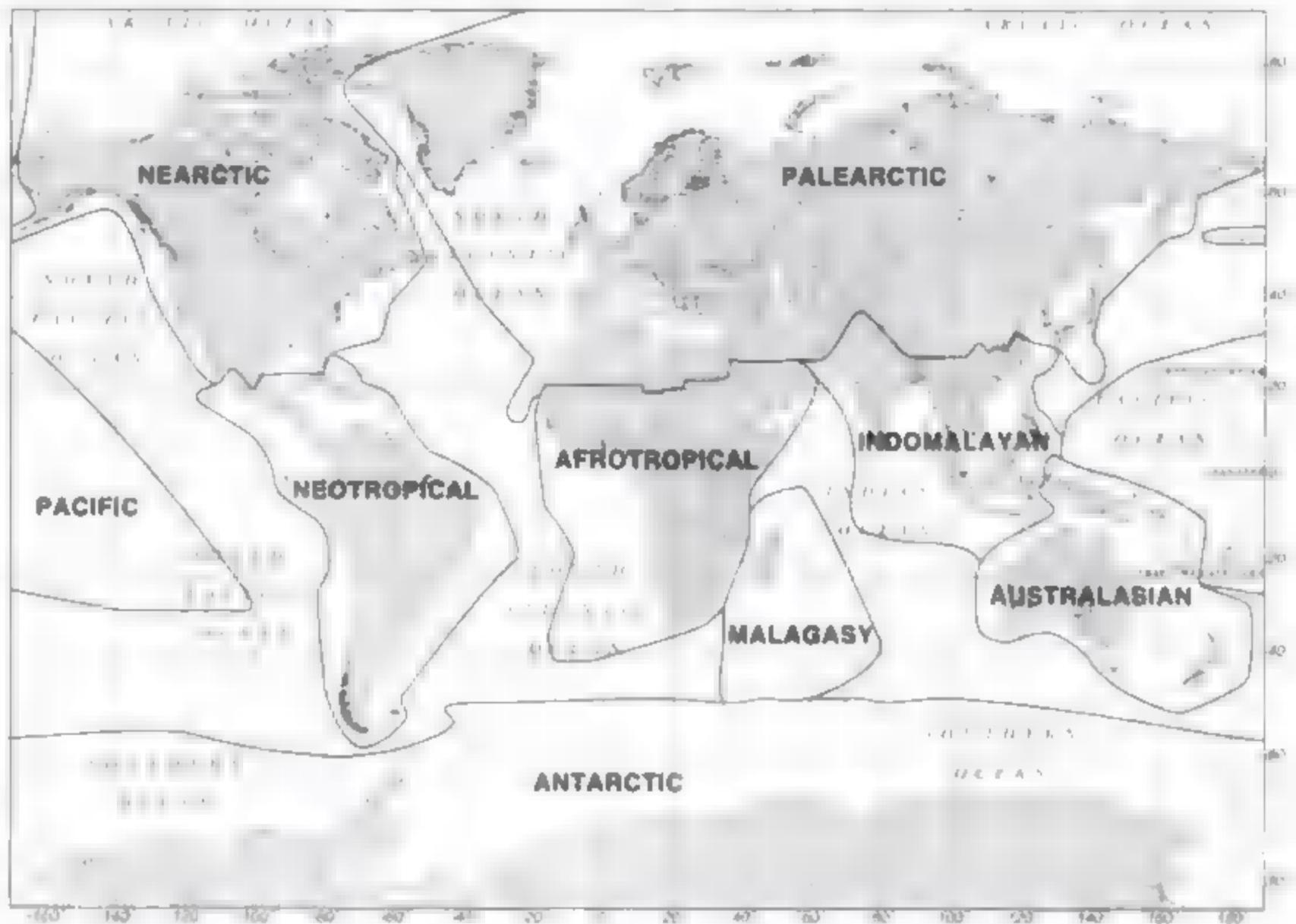


Fig. 1. The boundaries of the world's zoogeographical regions, as used in this book.

In fact, the species illustrations do not exactly follow the taxonomic sequence used in the rest of this book: most plates have to show two to four species and, for ease of reference, similar related birds are grouped according to zoogeographical regions. The ranges and natures of such groupings may be judged from the plate headings; the likelihood of a particular raptor's presence in the area concerned can then be seen from the relevant map. It is inevitable that some groupings, for example of endemic island buteos, have had to be quite artificial.

The first aim of the species plates is to show adult and juvenile plumages, both perched and in flight, together with a selection of subspecies to indicate the range of racial variation. The illustration of plumages intermediate between juvenile and adult is more difficult because of their complexity. Some raptors, especially tropical species, may be in an almost continuous state of slow moult throughout the year, except when breeding; others commonly are in moult for up to half the year (typically either while, or while not, nesting, or linked with seasonal climate, and usually not on migration), or the period may be even longer if, especially among strongly migratory species, the process is suspended, or 'arrested' in the middle. Although many of the larger raptors have one or more clear intermediate plumages (whereas smaller species moult directly from juvenile to adult), these often include feathers of the previous and next stages ['Raptor moult patterns and age criteria', pp. 50-53]. According to species, the whole process of arriving at the adult plumage may take from one year to seven or eight (even nine in the case of the Golden Eagle *Aquila chrysaetos*). Certain New and Old World vultures, for example, may retain some juvenile feathers for three to five years. Thus, many intermediate plumages, even though recognisable as a particular age, are essentially a mixture.

Where possible, one or two intermediate plumages are shown as a general guide, particularly if these are in some way not intermediate in character (for example, if the immature plumage is darker than either the juvenile or the adult). But in many cases it is difficult to fix a typical plumage and the observer must realise that there can sometimes be a complicated series of stages.

Male and female plumages are shown where these differ, but often the only distinction is one of size. The original aim was that all the perched figures on any one plate should be at the same scale and, similarly, all the fliers at an inevitably smaller scale; also, as a means of indicating reversed sexual dimorphism, or RSD, the perched adult should be a male and the flying adult a female, with the converse for the juveniles; but space and other considerations have forced a number of exceptions. The sex and age-class of each bird are shown in the facing caption text, which also makes it clear where any abandoning of scale is not

obvious; actual sizes can be judged from the length and wingspan dimensions given in the facing captions.

The ideal might have been to show all fliers from both above and below but, with 313 species, several hundred races, different sexes and varying ages, this would have increased the total of individual illustrations to many thousands. There was just not room. Therefore, the species which are most often seen high up or soaring (such as vultures, buteonines, buteos and eagles) are depicted in flight from directly below. Some are also shown from above, especially where particular points are then brought out, but owing to the confines of space the pattern from above will often have to be judged from the perched bird and the facing text. Certain other groups (notably the large genera of accipiters and falcons) are shown from a more side-on angle, which better represents the direct flight in which they are commonly seen and enables both an upperwing and an underwing to be illustrated.

In all, on the 112 plates, some 2,115 birds are shown, 1,135 of them in flight. The artists have worked from museum skins so far as was possible, in conjunction with photographs and our own and other people's field experience. In their efforts towards greater accuracy over shape and proportions, KF and DM have often taken 50 or more measurements from each of many of the skins studied.

### Distribution maps

Nearly every species has a colour distribution map by its caption text opposite the plate: the exceptions are that the relatively recently distinguished Forbes's Kite *Leptodon forbesi* is not illustrated in colour, having instead both a monochrome map and line-drawings within its main text, and on plate 26 no fewer than nine allopatric insular serpent-eagles *Spilornis* are combined on one map. Most of the map projections used have the advantage of parallel latitudes, like traditional Mercator but without so great an exaggeration of temperate land areas: the equator and the two tropics are inserted as solid and broken lines respectively.

The colour scheme followed is:

**Green** Resident, or at least of regular occurrence throughout the year, even though numbers may fluctuate seasonally.

**Yellow** Present only in the nesting season, and usually breeding.

**Blue** Regular, but does not breed, in what may be winter quarters or areas of shorter seasonal dispersal.

Paler tints of the same colour scheme show areas of more scattered distribution (for some species), and dotted lines irregular limits, while attention is drawn to small islands by appropriately coloured arrows. Thus, a pale green tint indicates a sparsely distributed resident, etc. In a few cases – Sharp-shinned Hawk *Accipiter striatus* is a good example – black lines are used to indicate boundaries between races which may be better treated as distinct species (a step already taken for the serpent-eagles on plate 26).

Though routes and seasons are discussed in the main species texts [see also 'Raptor migration', pp. 44–49], no attempt has been made to show on the maps areas of migrant occurrence: these may usually be taken to lie more or less directly between breeding and non-breeding zones, with concentrations at land bridges. Most raptors prefer to avoid lengthy sea-crossings, so there are noted concentrations at such isthmuses as Panama, Sinai and Kra, at such narrows as the Gibraltar, Malacca and Korean Straits, and along such island chains as the Antilles, Ryukyus (Nansei-shoto) and Sundas.

Many sources have been used in attempting to plot these distributions, but the following published maps and other references have, in particular, been widely adopted as baselines: for North America, Clark & Wheeler (1987) and Palmer (1988); for Mexico and Central America, Howell & Webb (1995), extended for Costa Rica and Panama by texts of Stiles & Skutch (1989) and Ridgely & Gwynne (1989); for South America, originally Blake (1977), but greatly modified by maps and texts in various national field guides, avifaunas and other lists, particularly Fjeldså & Krabbe (1990) for western sections and Canevari *et al.* (1991) for Argentina; for West Indies, Raffaele *et al.* (1998); for Greenland, Cramp & Simmons (1980) and Palmer (1988); for the West Palearctic, originally Cramp & Simmons (1980), amended for Middle East and North Africa from Hollom *et al.* (1988) and Porter *et al.* (1996), and for Israel from Shirihai (1996), but then adapted to take account of Hagemerijer & Blair (1997) and Snow & Perrins (1998); for Africa, originally Brown *et al.* (1982) and Snow (1978), but greatly modified by maps in Steyn (1982), Hollom *et al.* (1988), Lewis & Pomeroy (1989), Zimmerman *et al.* (1996) and especially Kemp & Kemp (1998), as well as texts in many other national and regional publications; for Madagascar, originally Dee (1986) and Langrand (1990), then Morris & Hawkins (1998) and Sinclair & Langrand (1998); for Asiatic Russia and other parts of former U'SSR, Flint *et al.* (1984), with some data from Vaurie (1965), and world maps in Cramp & Simmons (1980); for China, Cheng (1987) and Xu *et al.* (1996); for Korea, Pyong-Oh Won (1993); for Japan, Brazil (1991); for India, originally Ali & Ripley (1978), but then replaced by Grimmett *et al.* (1998); for Burma, Smythies (1953); for Thailand, Lekagul & Round (1991); for Cambodia, Laos and Vietnam, King *et al.* (1975); for Philippines, Dickinson *et al.* (1991); for Wallacea, data in White & Bruce (1986); for New Guinea, Coates (1985) and Beehler *et al.* (1986); for Australia and New Zealand, Marchant & Higgins (1993), also Simpson & Day (1984) and Blakers *et al.* (1984).

In the corner of each map is a figure in the range 1–7, which relates to an estimate of the world population ('Orders of population size', p. 26).

### Condensed caption text

Unlike many other larger birds, raptors tend to be seen rather briefly in the field and often only in flight. Therefore, it seemed important to condense as much information as possible onto the pages facing the plates. In this connection, all the terms used in describing the parts of a bird need to be clearly understood ('Raptor topography', pp. 27–30).

The aim has been to give the observer as much information as possible about size, shape, jizz, flight, plumage, habitat and distribution on these double-page plate spreads – although, obviously, much detail has had to be left to the main texts in the second half of the book.

Each species heading has a number, which accords with that of the taxonomic sequence adopted here, followed by the English name and scientific name, with a page reference to the detailed text.

Immediately below this heading is a line of text which give the ranges of that species' total length (L), wingspan (S) and tail length (T) in centimetres, each followed in parentheses by the middle of the range in inches rounded to the nearest whole ('Measuring lengths and wingspans', pp. 31–34).

At the end of that line, the size of the male in proportion to the female is expressed as a percentage, based on the cube of the middle of the range of the standard wing measurement of the one over the other. The cube is preferred for this purpose here, as a means of suggesting the difference in mass or bulk rather than in linear dimension. For many species there are few data on weights and these cubed wing measurements can correspond reasonably well with such weight differences as have been recorded – though sometimes there appears to be no connection.

(For those who prefer to think in terms of a linear difference in size between the sexes, a cubed percentage of 95% is roughly equivalent to a linear percentage of 98%. Similarly, 90% equates approximately to 97%, 85% to 95%, 80% to 93%, 75% to 91%, 70% to 89%, 65% to 87%, and 60% to 84%. In other words, for every 5% that the cube decreases, the linear figure does so by around 2%. The RSD is also indicated in the detailed species texts in the second half of the book, but there as a linear percentage the other way around: the amount by which the female is larger than the male.)

The condensed captions are, of course, concerned mainly with notes on the plumages illustrated; incidentally, colours of cere and legs are normally mentioned only when they are *not* yellow ('Identifying raptors', pp. 40–43). Each part of the caption is keyed to the appropriate bird on the plate, where all the individuals of one species are identified by the species number, followed by either one or two letters: the first such letter, in the series a/b/c/d, shows which of the different plumages listed in the facing text is involved; the second, in the series x/y/z, is used when there is more than one representation of the same plumage (for example, perched, flight from below, flight from above). Where subspecies, or races, are distinguished in the captions, these are referred to by the third part of the trinomial scientific name or by the word 'nominate' (more correctly, 'nominotypical'), which applies to the first-named race. The range of any subspecies is briefly indicated.

Below the heading and above the individual plumages, each species caption also opens – so far as knowledge and, more especially, space allow – with a separate paragraph that aims to indicate habitat, general proportions, position of folded wing-tips in relation to tail length when perched, flight action, dihedrals when gliding and soaring [fig. 12 on p. 42], and odd notes relevant to identification on, for example, hunting, voice, and flocking.

At the end of that opening paragraph, in square brackets (also used throughout these caption texts when referring to plumages or patterns not visible on the plate), there may be one to several numbers preceded by cf.: these are the reference numbers of other species with which the bird concerned is most likely to be confused. Any letters with the number relate to the plumages involved: if the letter is bold and preceding, it is the plumage of the species whose text this is; if it is roman and following, it is the plumage of the confusion species. (This may sound complicated, but these numbers are intended only as reminders: the species and plumages are properly named under Confusion Species in the main species texts.)

### DETAILED SPECIES TEXTS

This other main part of the book gives a comprehensive but highly summarised outline of basic knowledge, species by species, with a series of set headings. At the top of the text appear the reference number and English and scientific names, together with the plate number. The scientific name is accompanied by the surname of the authority who first named the species, and the year in which that was done (these being shown in parentheses if the bird was originally placed in a different genus). Alternative English names used in other national or international books are given after the main heading; in some cases, a name that we would consider to be preferable to the one used here, but which we think is probably at present too iconoclastic to gain widespread acceptance, is also given.

### **Distribution**

This opening section of each species text backs up and amplifies the map, which is repeated here at a larger size but in black and white, with colours replaced by tones (darkest tone = resident, mid-tone = breeding visitor, palest tone = non-breeding/winter visitor, while hatching indicates more sparse distribution). It includes the zoogeographical region or regions [fig. 1 on p. 21] in which the species is found; the latitudinal extremes of its range (usually to the nearest 1°, but in a few cases to 0.5°); an estimate of the order of magnitude of the population [p. 26]; and an indication of whether it is 'common', 'local', 'scarce', 'rare', 'decreasing' or 'increasing', and so on. The range is then specified by continent or region and detailed by countries (qualified as appropriate by states, islands, or other limitations).

### **Movements**

This section states whether the species is sedentary or migratory and, if the latter, summarises the routes, timings and non-breeding quarters involved; significant vagrant records are also mentioned.

### **Habitat**

The habitat and any known limiting factors are summarised, together with the altitudinal range.

### **Field Characters**

Recognition being the main aim of the book, this is the meat of the texts. It is divided into three parts. The first outlines size and perched shape among the broad groupings of 'cathartid vultures', 'kites', 'fish-eagles', 'vultures', 'snake-eagles' and 'serpent-eagles', 'harriers', 'accipiters', 'accipitrines', 'buteonines', 'buteos', '(true) eagles', 'caracaras', 'falconids', 'forest-falcons' and '(true) falcons', together usually with brief mention of adult patterns; then perching behaviour, including position of folded wing-tips in relation to tail length; and, finally, an indication of whether sexes and immatures are similar or different, with RSD [pp. 35–39] expressed by percentages, usually taking female median and maximum wing lengths over male median and minimum. In some cases, where relevant, a brief reference to behaviour (e.g. if generally unobtrusive, or tame, or crepuscular) is incorporated, and, if the species is dimorphic or polymorphic, this also is stated.

The second paragraph, headed '**Perched**', describes perched adult, male and female, juvenile and other immatures as necessary. In general, these descriptions are broad outlines that use a mixture of ornithological terms for body parts and feather tracts and, for convenience, some slang words ['Raptor topography', pp. 27–30]. Colours of eyes, cere, any bare head skin, and 'legs' (if tarsi unfeathered) or 'feet' (if tarsi feathered) are given at the end in separate sentences following the heading 'Bare parts'. (The commonly yellow cere and legs often attract attention on perched raptors, but are of limited use in identification.)

The third and final paragraph in this section, headed '**Flight**', opens again with size and shape (here often comparing the species as a 'raptor', rather than as a 'kite', 'eagle' or any other of the broad groupings previously mentioned), including ratio of median wingspan to median total length; flight actions and wing positions in gliding and soaring (where known) are described, and then the patterns of adult and immature plumages from above and below.

### **Confusion Species**

This section sets out the other raptors that are most likely to be mistaken for this particular species, and the main ways in which each of them differs from it.

### **Voice**

The most obvious calls are summarised, with phonetic renderings; but this is not intended as an exhaustive vocabulary, and other sounds may be made at times, especially near the nest. Many raptors are generally rather silent out of the breeding season and – with notable exceptions, particularly among species of dense forest – voice plays a relatively small part in field identification. Some calls, however, are strikingly characteristic and others will draw attention to high-flying raptors.

### **Food**

The main food categories are summarised, not least because of the link, whether through cause or effect, with reversed sexual dimorphism, or RSD ['Sex and age differences in sizes and shapes', pp. 35–39]. Foraging methods are also described.

### **Sociosexual Behaviour**

The first aim of this section is to indicate whether the species is solitary or, at least sometimes, gregarious: many raptors congregate, if at all, only on migration or at abundant food sources, but one described as 'solitary' may, of course, at times be seen in pairs or family parties (these are mentioned when such pairs or parties are a common sight). The second aim is to refer to, especially, aerial or other displays that are likely to attract attention.

### **Breeding**

Data on basic breeding biology, where available, are summarised in the form of season (period nest occupied with eggs or young, not just egg-laying); structure, size and position of nest, with ranges of height above ground; normal clutch size (abnormal extremes in brackets); and incubation, fledging and dependency periods. (But descriptions and measurements of eggs and nestlings have not been included.) Although not at first sight linked directly with identification, breeding season relates to state of moult, nest site to habitat, number of eggs to population, and incubation and fledging to behaviour of adults.

### **Population**

As justification for the order of magnitude given on the map and under 'Distribution' for each species, this section attempts to indicate the possible or likely size of the total population, particularly at the beginning of the breeding season, against an estimate of the land area of its breeding range and any known data on densities ['Orders of raptor population sizes', p. 26]. This method was earlier used by Cade (1982) for falcons and, although the results may often be no more than educated guesses, it seems useful to try to set a baseline which others can build on or criticise as more information becomes available. This section also attempts to note declines and increases, and to indicate likely causes and future threats.

### **Geographical Variation**

Quite a number of raptor species are dimorphic or even polymorphic and, though this will usually have been brought out under 'Field Characters', the morphs are briefly listed here. But the main aim of this section is to indicate geographical variations in size and, especially, colour among species with wide distributions or insular populations. In continental regions this variation is often clinal - changing gradually over long distances - and then extremes are given subspecific names. All recognised races are listed with their geographical limits and, briefly, plumage distinctions or other characters. Some designated races may well be good species, and special attention is drawn to these (as it also is in the caption texts opposite the plates). At the next level, closely related and largely allopatric species may be classed as forming 'superspecies'.

### **Measurements**

These are the standard measurements, in millimetres, of folded wing, tail and tarsus. Most are taken from published sources, so differences in basic and individual measuring techniques are not allowed for, but our main concern is to use the wing figures to show size differences between the sexes and, to a lesser extent, between races: if a published set of measurements relates to both sexes, any variation in techniques is not too serious a problem here.

The folded wing is always measured from the carpal joint to the tip of the longest primary, normally with the whole flattened and straightened (maximum chord) or, for larger species, sometimes using a tape to follow the natural curve along the top (curved chord). A few field and museum workers, perhaps mainly now in the Americas, still simply flatten the wing in the middle without straightening it (flattened chord) or make no attempt to correct the curvature at all (minimum chord). The difference between maximum and minimum chords can be as much as 10%. Wing measurements of skins can also be about 2% shorter than those of live birds (e.g. Prater *et al.* 1977), though this may be not so much more than the variation between individual measurers ['Measuring lengths and wingspans', pp. 31-34]. The tail is measured from the base of the central feathers to the tip of the longest; and the tarsus (strictly, the tarsometatarsus) usually from the notch at the back of the 'knee' (intertarsal joint) to the base of the top of the middle toe. **Weights** are quoted where available, in grams, but these vary greatly according to season, state of moult, preparation for or consequence of migration, and even time of day, so are of limited use except in the few cases where special studies have amassed a lot of data; nevertheless, they do help to give some indication of differences in bulk between males and females.

Measurements used here normally relate to adults only; depending mainly on their genus [see caption texts to plates 1-3], juveniles of many species of raptor have either a longer or a shorter tail, and variously broader, narrower, longer or shorter wings.

### **References**

Literature sources are listed by surname(s) and year: details may be found in the bibliography. A few standard works used throughout, such as *Birds of Prey of the World* by Grossman & Hamlet (1964), *Eagles, Hawks and Falcons of the World* by Brown & Amadon (1968), *Distribution and Taxonomy of Birds of the World* by Sibley & Monroe (1990) and volume 2 of *Handbook of the Birds of the World* edited by del Hoyo *et al.* (1994), are referred to in the introduction but not cited individually.

## ORDERS OF RAPTOR POPULATION SIZES

The maps are only a general guide. Within the distribution shown, a species may be really numerous, common, sparsely scattered, uncommon and local, very rare, or anything in between. This often, but by no means entirely, depends on availability of suitable habitat and food supply.

An attempt has, therefore, been made to put flesh on the bones by expressing broadly estimated world populations as orders of magnitude to the tenth power, or logged to the base 10. These are intended to reflect the total numbers of individual birds (not pairs), both breeding and immature or other non-breeding, at the start of the nesting season: that is the most sensible point in the year at which to aim, because, for the majority of genera, the numbers will become considerably higher when all the fledglings leave the nests, and thereafter dwindle over the next few months as many of the inexperienced young and a proportion of older birds die from one cause or another. In the corner of each map, and enlarged upon in the main text, is a figure in the range 1-7:

- 1 = 1-10 birds
- 2 = 11-100
- 3 = 101-1,000
- 4 = 1,001-10,000
- 5 = 10,001-100,000
- 6 = 100,001-1,000,000
- 7 = over 1 million birds

Each order of magnitude is easily converted by thinking of it as the number of figures in the population size, or the number of zeros in the maximum. Thus, 4 shows a four-figure total (in the thousands), or at most 10,000 birds.

Such estimates serve well enough up to 100,000 (order 5), though they have rightly been criticised as 'increasingly crude and unsatisfactory' for the commoner species above that level (e.g. Nicholson 1988). Some three-quarters of raptors worldwide, however, are *not* above order 5 and, since many are under grave threat - not least from deforestation or other land development, shooting and trapping, or pesticide and petroleum pollution - it seems important to make considered references to population levels which may then encourage more thorough research.

Here, these figures also give an idea of relative densities when comparing the maps for different species. Thus, the Peregrine Falcon *Falco peregrinus* and the Osprey *Pandion haliaetus* might seem at first sight to be the two commonest raptors, because of their almost cosmopolitan distributions, but both stand only at order 5 (no more than 100,000) - even though the world Peregrine population must formerly have been higher than that (Ratcliffe 1980).

Indeed, on the figures given, it is likely that some 80 other species are more numerous than those two, including three cathartid (New World) vultures, 12 honey-buzzards and other kites, five Old World vultures, one serpent-eagle, one gymnogene, six harriers, 15 accipiters and accipitrines, 17 buteos and buteonines, seven true or booted eagles, five caracaras, two forest-falcons and ten true falcons, many by a factor of 10, some much higher still.

The world numbers of some raptors are more precisely known, because they are rare, highly localised and well studied (for example, Mauritius Kestrel *Falco punctatus*), are conspicuous and limited by habitat (Osprey) or by winter distribution (Steller's Fish-eagle *Haliaeetus pelagicus*), or are capable of being counted to a significant extent at narrow bottlenecks where they concentrate on migration routes (Mississippi Kite *Ictinia mississippiensis*). (Incidentally, for a few species, such as Levant Sparrowhawk *Accipiter brevipes*, migration counts have shown the sum of previous breeding-population estimates to be absurdly low.) These and others where it also seems safe to be less cautious have their orders of magnitude qualified by a minus or plus sign to indicate that they are at the lower or upper end of that range.

Although knowledge of bird distributions is growing all the time, many raptors pose special problems because of their comparative scarcity and difficulties of discovery or recognition. In some cases, the population can only be guessed at. For certain forest species which are assumed to be steadily declining through habitat loss, our figures may be already out of date.

These orders of magnitude, based on density estimates from population data and calculations of total areas of breeding range along the lines of those used by Cade (1982) for the falcons, were commented on in the earliest stages by Dr Tom J Cade (World Center for Birds of Prey), Dr N J Collar (BirdLife International), and Dr B-U Meyburg (World Working Group on Birds of Prey and Owls) as well as, for Australia only, by Stephen Debus: all made valuable criticisms, though the extent of disagreement was remarkably low, but the final responsibility for the orders given here is ours alone.

## RAPTOR TOPOGRAPHY

Anyone wanting to describe a bird for subsequent identification or confirmation needs to be able to define the parts of the body, the feather tracts, and so on. These are variously set out in figs 2–9.

The upper section of each of the three pages shows the topography of, respectively, a perched raptor, flying raptors from above and below, and raptor heads. These combine both technical terms and several more general words, some analogous with the human body, that have also been used for convenience in this book, especially in the caption texts facing the plates, where space is often very tight.

For example, primaries are attached to the manus, or 'hand', and secondaries mainly to the ulna, or rear 'forearm'. The rather obsolete and avoidable term 'tertiaries' (or 'tertiaries'), which has variously been applied to the innermost secondaries and to elongated coverts attached to the humerus, or 'inner arm', has no particular relevance in raptor identification and, although included in figs 2 & 5 for the sake of completeness, is otherwise never used here.

The lower parts of these three pages illustrate assorted raptor tails, wing shapes, and crests, together with various types of body markings and wing patterns [see 'Identifying raptors', pp. 40–48]. It should be added that 'shaft-streaks' and 'fine streaks' are confined to (usually dark) shafts and sometimes very narrow adjacent strips of the feathers.

Apart from 'remiges' (primaries and secondaries together), 'rectrices' (tail-feathers) and 'quills' (remiges and rectrices combined), a number of specific and slang terms are both used in more general ways in captions and, to a lesser extent, in main texts; the meanings should usually be obvious. From above, 'back' is often adopted for mantle, back and scapulars together, and 'rump' may be loosely used to mean or include uppertail-coverts. From below, 'abdomen' covers lower breast, flanks and belly, and 'crissum' both vent and undertail-coverts. In flight, 'arm' (inner wing), 'wrist' (carpal joint), 'hand' (primaries and primary coverts), and 'fingers' (emarginated parts of spread primaries) should all be clear, while 'wing-linings' (or simply 'linings') stands for the whole area of the underwing-coverts and axillaries, and 'armpits' for just the axillaries and innermost underwing-coverts. What is meant by the occasional use of more outrageous terms, such as 'shawl', 'trousers' (or, in display, 'flaps'), 'stockings', 'waistcoat', 'cummerbund' and even 'finger-tips' or 'finger-nails', will be obvious from the plates concerned.

Raptors are, in general, darker above and paler below. Upperparts tend to be obscurely to obviously scaled and, to varying extents, more obscurely streaked and barred; underparts may be plain to strongly streaked or barred. The quills are often barred or banded, with a pattern comparable to that of the tail variously indicated on the secondaries, while the colours and markings of the wing-linings are often an extension of those on the chest or breast, or both. The main colours, particularly above, turn paler and duller through the action of sunlight: thus, blacks become browner, buffs creamier, and so on.

Dimorphism and polymorphism are relatively common: more than half the buteos and a number of accipiters, for example, have melanistic morphs, some common, others rare [see 'Raptor plumages and external structure', pp. 57–68]. Alternatively or in addition, certain raptors have erythristic or abnormally light or even albinistic morphs. All these are shortened simply to 'dark', 'rufous', 'brown', 'pale', 'grey' or 'white' as appropriate, both in the caption texts and as subheadings in the main texts.

In all the texts, too, are frequent references to certain areas of the body, especially the back and wing-coverts, being 'tipped', 'edged', 'fringed' or 'scaled', usually with a paler colour. These terms refer to the pattern on the individual feathers. 'Tipped' indicates that the tip of each feather is more buff, more rufous, or whatever it may be, than the rest: this tends to produce a spotted effect, the extent of the tips affecting the size of the spots. 'Edged' should strictly refer to pale feather-sides, and 'fringed' to sides and tips, but, as the distinction between the two is rather variable in raptors, we have tended to use them as alternatives; the effect again depends very much on the breadth of the edges or fringes: where these are broad and the effect is strong, 'scaled' emphasises the scaly pattern thus produced. Pale feather-edges abrade slowly over the year, so that 'scales' may become 'fringes' or 'edges' as the tips and sides wear off.

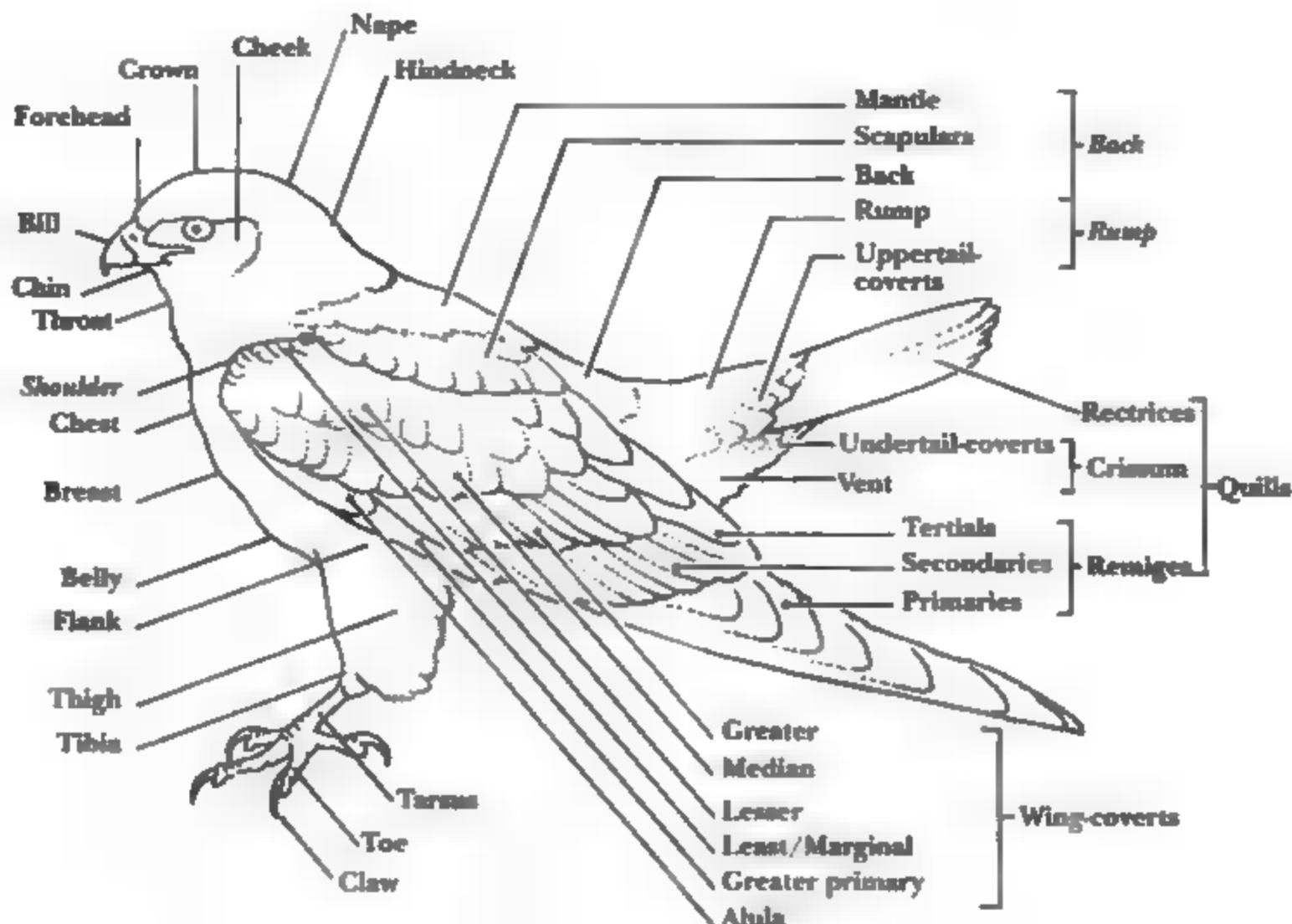


Fig. 2. Raptor topography: perched bird. General words, largely analogous to the human body, are printed in italics.

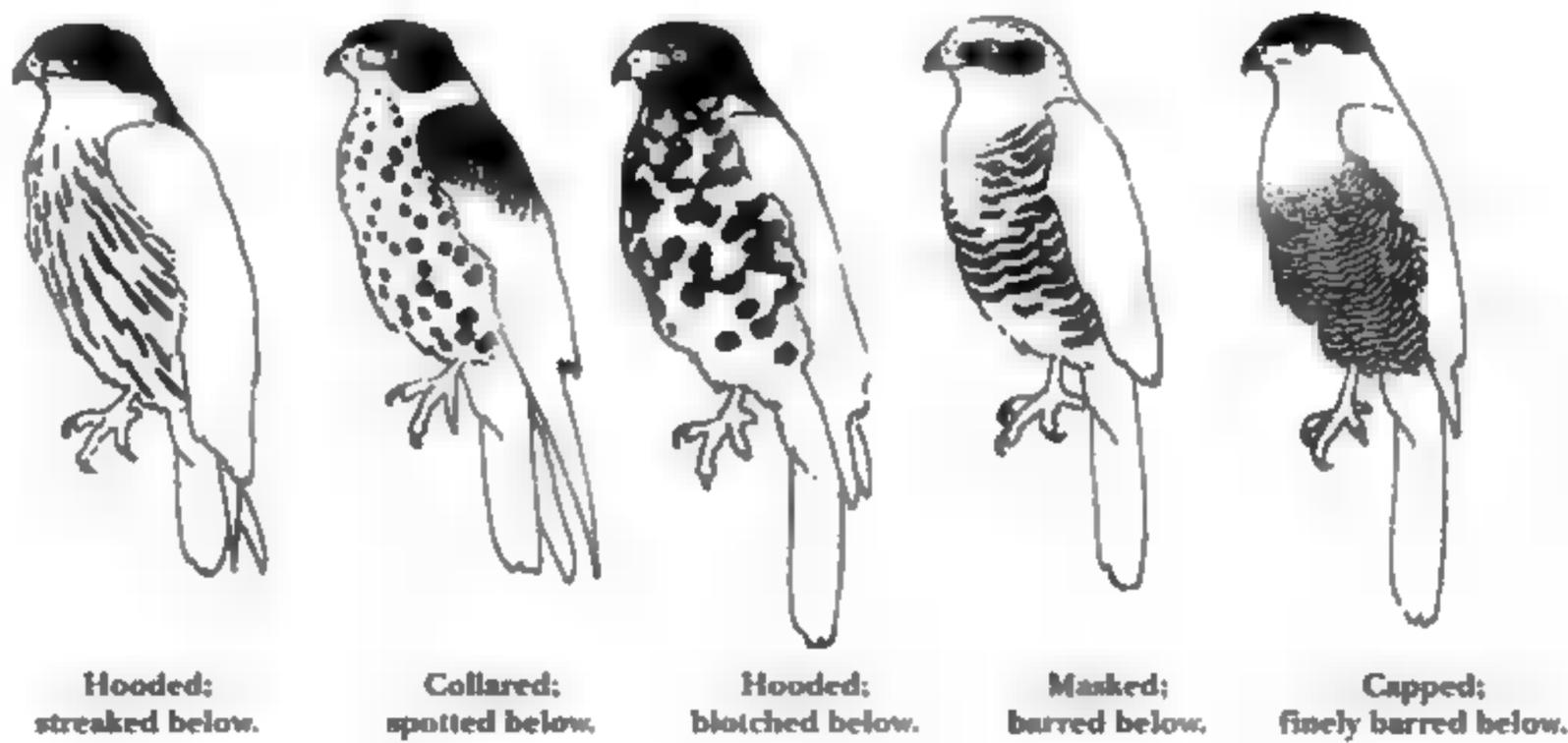


Fig. 3. Descriptive terms: patterns of head, and of underparts.

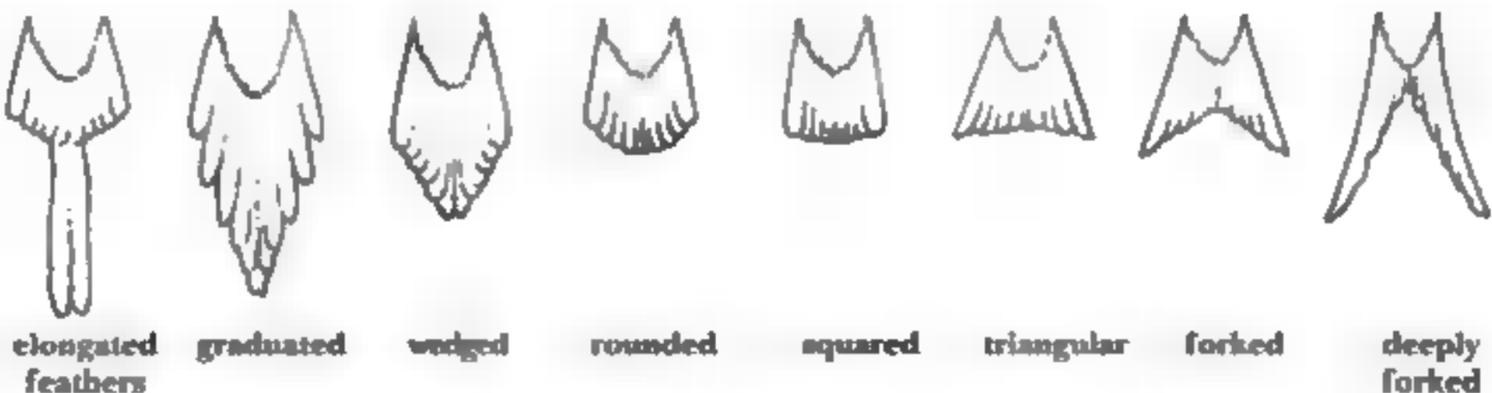


Fig. 4. Descriptive terms: tail shapes.

Fig. 5. Raptor topography: flying bird. General words, largely analogous to the human body, are printed in *italics>*.

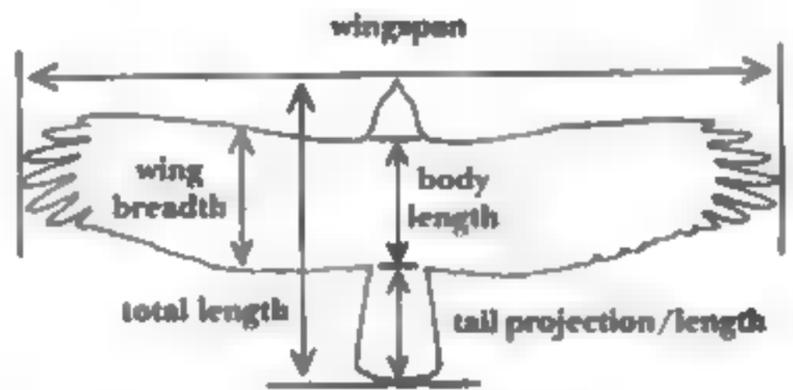
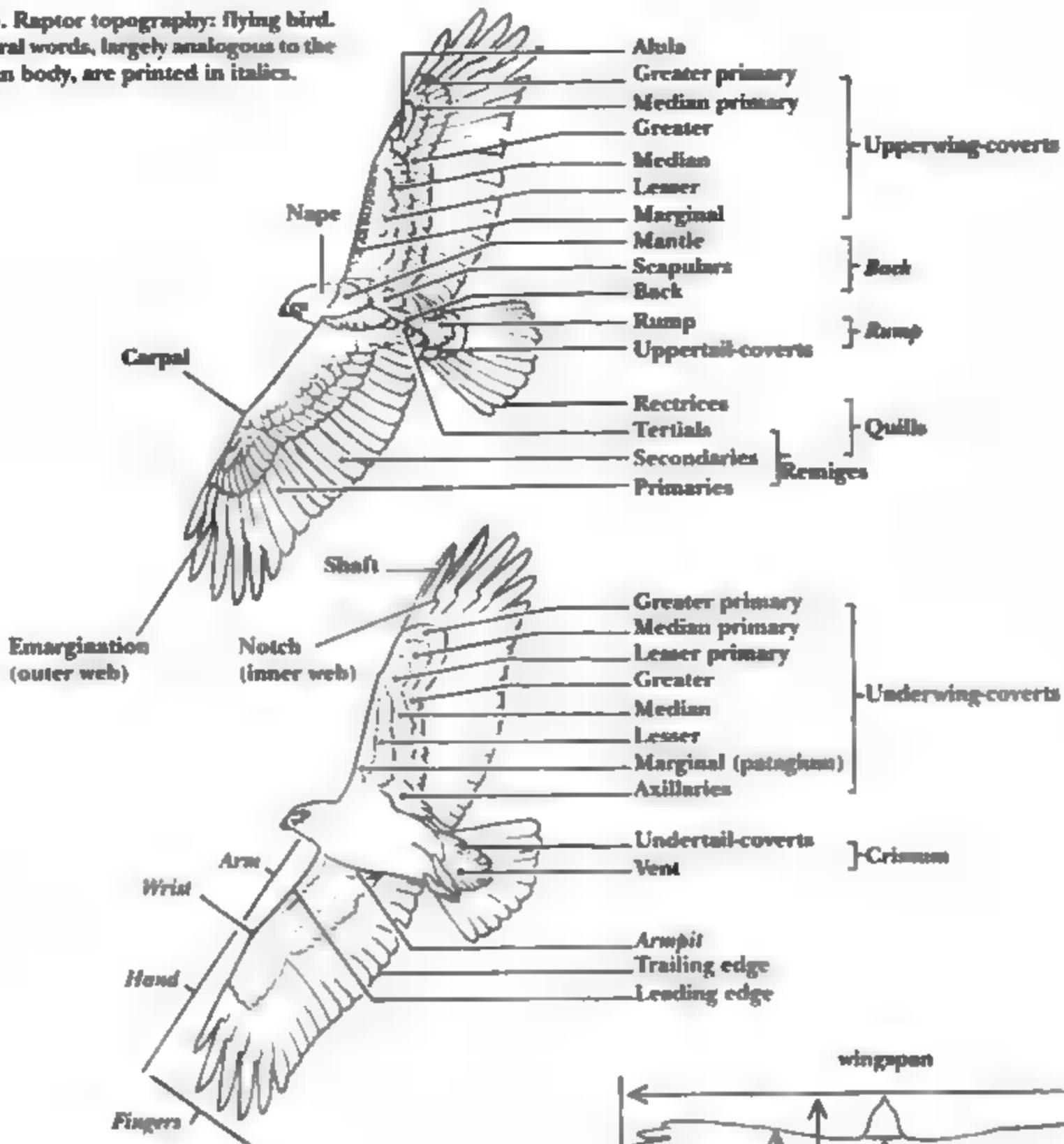


Fig. 6. Descriptive terms: dimensions.

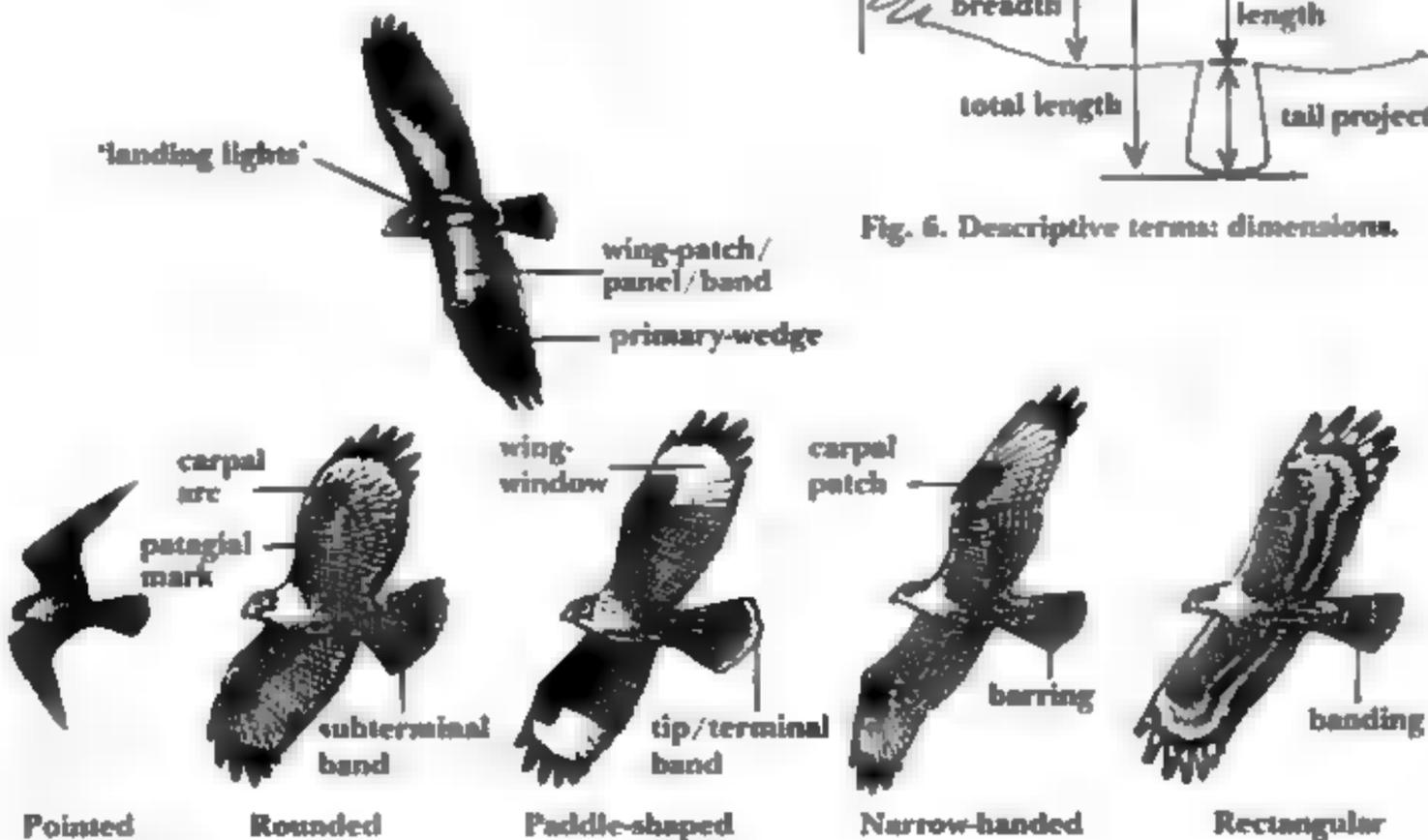


Fig. 7. Descriptive terms: wing shapes, and wing and tail markings.

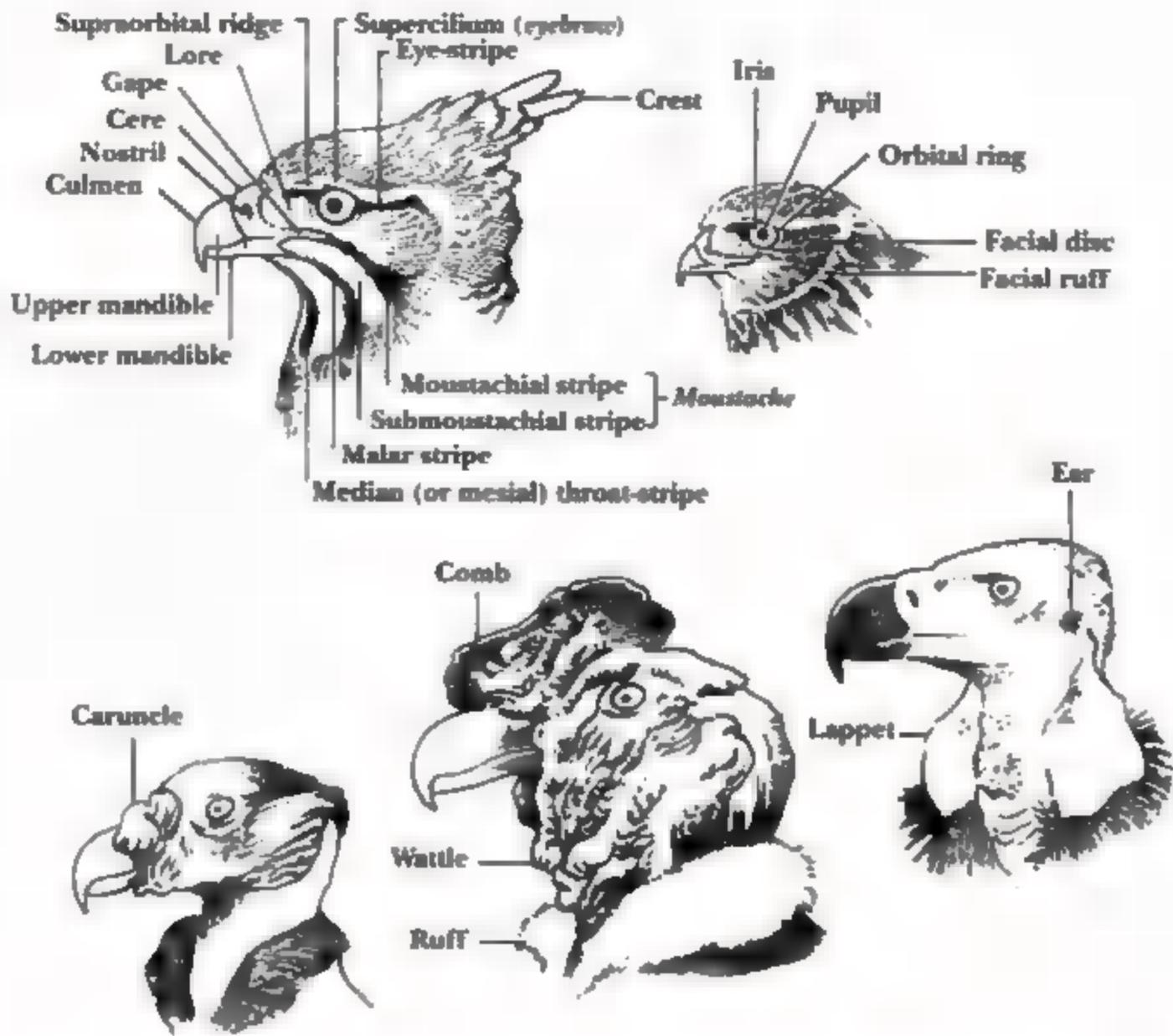


Fig. 8. Raptor topography: head. General terms, largely analogous to the human body, are printed in italics.

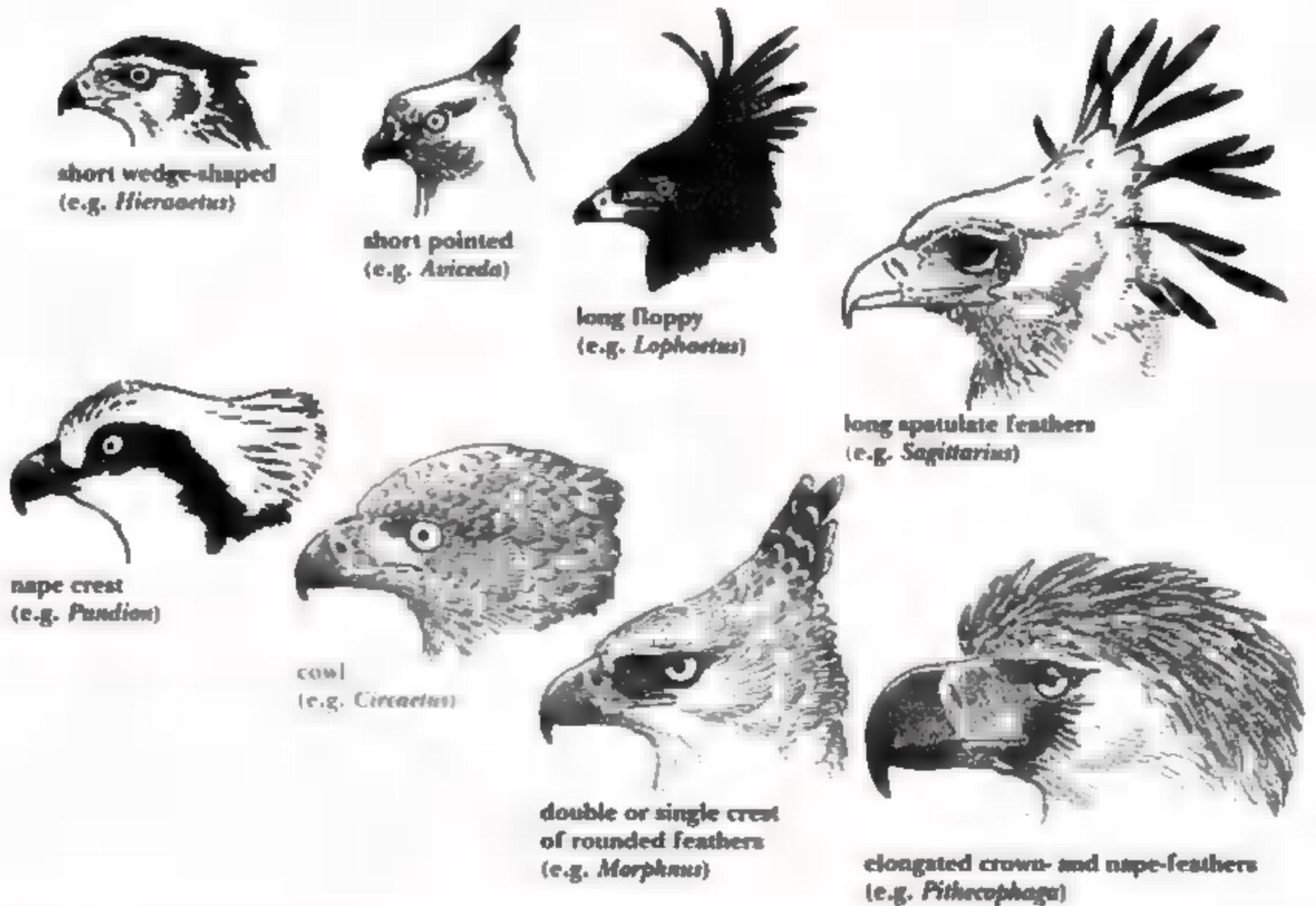


Fig. 9. Descriptive terms: crests.

# MEASURING LENGTHS AND WINGSPANS OF RAPTORS

The species texts include ranges, in millimetres, of the standard measurements of folded wing, tail and tarsus (though not bill), together with weights in grams where possible but, for larger species, in kilograms rounded to one place of decimals. Almost all are taken from previously published sources.

Such measurements are regarded here as adequate although, because of international differences in both basic and individual techniques, as well as a known slight shrinkage in museum skins, they cannot be regarded as inviolate. This applies particularly to the larger species, where variations in ways of measuring wing chords have the greatest effect.

## TOTAL LENGTHS

For field identification, these standard measurements are of no help whatsoever in indicating the size of a species. For that, bird books traditionally give a total length, which used to be embodied in a rounded mean (sometimes later, with increased use of the metric system, converted from inches to millimetres with unjustified precision!).

Some bird species, however, vary proportionately almost as much in size as do human beings, with both individual and racial differences, and so it is now more customary to give a range of lengths. The birds in a single population will vary by 5–10%; subspecific differences may increase this to 15% or more. Again like human beings, most raptors additionally show sexual dimorphism, for some species and genera very marked, but with the females the larger.

Length, to the end of the tail, is taken either from the tip of the bill or from the top of the head. Sometimes this varies according to the bird family. Thus, long-beaked waterbirds always include the bill, while owls usually and raptors often are measured from the top of the head, particularly when museum skins are made up without the bill pointing forwards.

This last consideration serves to emphasise the fact that most total lengths have long been based on skins, the sizes and shapes of which may vary somewhat according to the methods of the skinner.

In recent years, however, information from live birds of prey has begun to accumulate. Clark & Wheeler (1987) published ranges of lengths, wingspans and weights for all North American raptors 'taken on live birds whenever possible'. David Noakes has been collecting similar data from live and freshly dead birds for the past 40 years, originally in the West Palearctic and then also in Australia, but to an increasing extent worldwide.

In a different way, Lars Svensson has aimed to calculate accurate measurements of lengths and wingspans, using photographs, skins with spread wings, and conventional skins, for many West Palearctic birds (to some extent included in Svensson *et al.* 1999).

The total lengths in this book have drawn on these and other reliable sources, as well as on our own data from skins. For some species we have had to use additional calculations. Length must, however, remain an imprecise guide to size. It is variable to the extent that birds stretch their neck, while a very short or long tail (and likewise bill in some other groups of birds) can distort the impression given by the figure(s) quoted.

## WINGSPANS

Except for the largest species with spectacular spreads, attempts at publishing wingspans are relatively recent. These can, in fact, be more accurate than total lengths, and for birds of prey are perhaps more useful, but they present their own problems.

In particular, spans can only with the greatest difficulty be measured from museum skins, which are usually made up with the wings folded. The lengths of ulna and humerus have to be added to the folded wing (carpal joint to wing-tip), the result doubled, and then a calculation attempted of the width of the body, which, even more than total length, is affected by the vagaries of the skinner. At the same time, the humerus is not an easy measurement on a museum skin, unless the coracoid end is first located with a needle, and it must be appreciated that it and the ulnus do not form a straight line even when the wing is fully spread.

As a result, most published spans of raptors and other birds have tended to be little more than variously educated guesses. Many have been inaccurate, some quite absurd, and, in a few cases, the figures given have been entirely outside the actual range. For example, spans of 135–165 cm for Northern Goshawk *Accipiter gentilis* and 130–160 cm for Gyr Falcon *Falco rusticolus* were stated in Cramp & Simmons (1980) and repeated in Snow & Perrins (1998), but it would be remarkable to think of even an exceptionally

large female of either of these species ever extending to well over 5 feet. The real spans (all races combined) should be 89–122 cm and 105–131 cm respectively, with the spread of the very largest females equivalent to 4 feet and 4.3 feet.

Thus, the first of these two ranges of wingspans given in Cramp & Simmons and Snow & Perrins is entirely outside the true one, and the second virtually so. Other West Palearctic raptors where the same criticism applies to their figures are Red Kite *Milvus milvus*, Black Kite *M. migrans*, Short-toed Snake-eagle *Circus gallicus*, Verreaux's (Black) Eagle *Aquila verreauxii*, Eleonora's Falcon *Falco eleonorae*, Sooty Falcon *F. concolor* and Northern Hobby *F. subbuteo*.

For the two kites and the snake-eagle, the figures published by Gænsbøl (1986, 1995) and even the otherwise excellent Porter *et al.* (1981) are equally inaccurate, as are those for a number of raptors in Hollom *et al.* (1988). Evidently some of these figures have simply been transcribed from one author to another. By far the most accurate for European species are the data in Bouchner (1976) and Bruun (1984).

On the other side of the world, the span of the Australian Wedge-tailed Eagle *Aquila audax* is known from several hundred live and freshly dead individuals to fall within the range 182–232 cm, so that reports of 279 cm and 284 cm (Wood 1972, Fleay 1972) must surely owe their size to error or exaggeration, as well as overstretching, while other claims of 314 cm and even 340 cm (Roche 1914) are just incredible. The Holarctic and Indomalayan Golden Eagle *A. chrysaetos* has a similar span of 180–234 cm, and again there have been claims of up to 284 cm.

Like the last two Wedge-tailed Eagles above, several other birds of prey have had reported spans of over 10 feet, but it is doubtful whether this mark (305 cm) has ever been reached in natural spread by any currently living raptor species apart from the biggest individuals of the two condors, the Andean Vulture *Vultur gryphus* and the California *Gymnogyps californianus*. Even then, it seems likely that 19th-century reports of spans of up to 11 ft (335 cm), quoted by Wood (1982) for both, had their origin in fancy rather than fact, let alone the same author's earlier reference (1969) to an old report, in about 1861, of an Andean Condor in Peru with a span of 14 ft 2 in (432 cm). Wood did quote evidently reliable records of 315 cm and 320 cm for the largest Andean Condors, but even then the wings must have been stretched to a full stop (see below). The same applies to his reported spans of a Himalayan Vulture *Gyps himalayensis* at 306 cm and a Monk Vulture *Aegypius monachus* at 300 cm.

Thus, most estimated raptor spans have erred on the large side, but the maximum 100 cm quoted by Ratcliffe (1980) for the female Peregrine Falcon *Falco peregrinus* is much too low, although the accompanying wing measurements are accurate.

These examples show the confused background to the subject of wingspans. Nevertheless, it is possible to obtain adequate measurements from live or freshly dead birds or, with the addition of a length for the longest primary, even from relaxed skeletons. In this respect we are greatly indebted to David Noakes for allowing us to use the raptor figures from the wingspan data that he has been amassing for the best part of 50 years from numerous sources in various parts of the world: dead and injured birds in the wild, living and dead birds in zoos and other collections, and measurements provided by ringers, falconers and birdwatchers.

Earlier, too, the late Colonel Richard Meinertzhagen accumulated data on wingspans and wing-areas of some 440 mainly Palearctic and Afrotropical bird species over many years. This was part of a long-term study of flight which, sadly, he never completed. These data are stored in two large folios and seven loose-leaf binders in the Natural History Museum at Tring, England (Snow 1987). His figures for raptors were taken from nearly 300 freshly dead birds of 46 species, a dozen of them also with detailed wing-structure plans. (Nevertheless, in view of the rather unfortunate evidence, obtained in the 1990s, that a proportion, at least, of Meinertzhagen's records could not be taken at face value, the stated localities of his collected specimens having in some cases apparently been falsified, it would seem perhaps diligent to exercise a degree of caution in any assessment of his data.)

As a check for North American spans, we have made use of the figures published by Clark & Wheeler. For the West Palearctic, Lars Svensson kindly provided us with his results based on a combination of measurements of skins, with one wing spread, and calculations from photographs. For Australia, Stephen Debus produced ranges from various sources and these figures have subsequently been included by Marchant & Higgins (1993).

In general, the proportions of hands, arms, body, legs and so on remain much the same in relation to each other in any one raptor species. David Noakes has, therefore, been able to arrive at multipliers (M) for many species, by which the span (S) can be calculated from the folded wing (W), so that  $S = W \times M$ . Although the length of the folded wing depends on the extent to which the natural curvature is corrected, a flattened and straightened wing (maximum chord) is the customary measurement on museum skins, and in many countries on live birds, while large species are traditionally measured with a tape along the upper side (which produces a figure close to the maximum value). The more American 'wing chord',

however, in which the wing is not pressed down on the rule, gives shorter results [see 'Measurements', p. 25].

With the main genera and commoner species well represented, it has been possible to extrapolate to all other raptors with some confidence. David Noakes's multipliers for different raptor species all fall in the range 2.75–3.65 (the extremes being represented by the Australian Black Falcon *Falco subniger* and the largest vultures). Lars Svensson, with his somewhat different methods, quite independently produced raptor multipliers in the range 2.85–3.5 for the Western Palearctic only.

The species with the higher multipliers have longer inner wings, or arms: to take a couple of non-raptor examples, the long-armed pelicans *Pelecanus*, at around 4.0, are extremes among land-based birds, while the multipliers of some of the pelagic albatrosses *Diomedea* may go as high as 4.5 or more. The species with the lower multipliers have longer outer wings, or hands, and relatively short arms: thus, the long-handed Common Swift *Apus apus* stands at only 2.4.

Eagles of most groups have multipliers in excess of 3.2; Osprey *Pandion haliaetus* and small vultures are in the range 3.25–3.3; and fish-eagles *Haliaeetus* and the larger of both New and Old World vultures are over 3.4. At the other end of the scale, most falcons are below 3.0 and a few below 2.8. In the middle, representing standard hawk shapes, accipiters are mostly 2.9–3.1, kites of all groups 2.9–3.2, harriers 3.1–3.2, and buteos 3.15–3.25.

Species of similar size may, of course, differ in proportions. Thus, Pallas's Fish-eagles *H. leucoryphus* and Golden Eagles have comparable spans but, because one has longer arms and the other longer hands, their respective multipliers are 3.45 and 3.25.

In some species with marked reversed sexual dimorphism (RSD), especially certain accipiters and falcons, but also, for example, a few of the buteos, there is a small but clear difference in the multiplier between the sexes. Males, lower by up to 0.2, have proportionately slightly longer hands and shorter arms. Conversely, it is worth noting here that, among Lammergeiers *Cypaetus barbatus*, where there is almost no RSD (though the females do average fractionally bigger), it is the larger individuals that have the lower multipliers.

Noakes holds the wings of live or freshly dead birds just above the carpals, and the positions of the tips are marked with pegs in the ground (fig. 10); the distance between the pegs is then measured. Through checking by removing and resetting one of the pegs, he has found that variation in this method seldom exceeds 1%: for instance, only up to 0.5 cm on an individual Northern Sparrowhawk *Accipiter nisus*, a species with a span in the size range 56–78 cm.

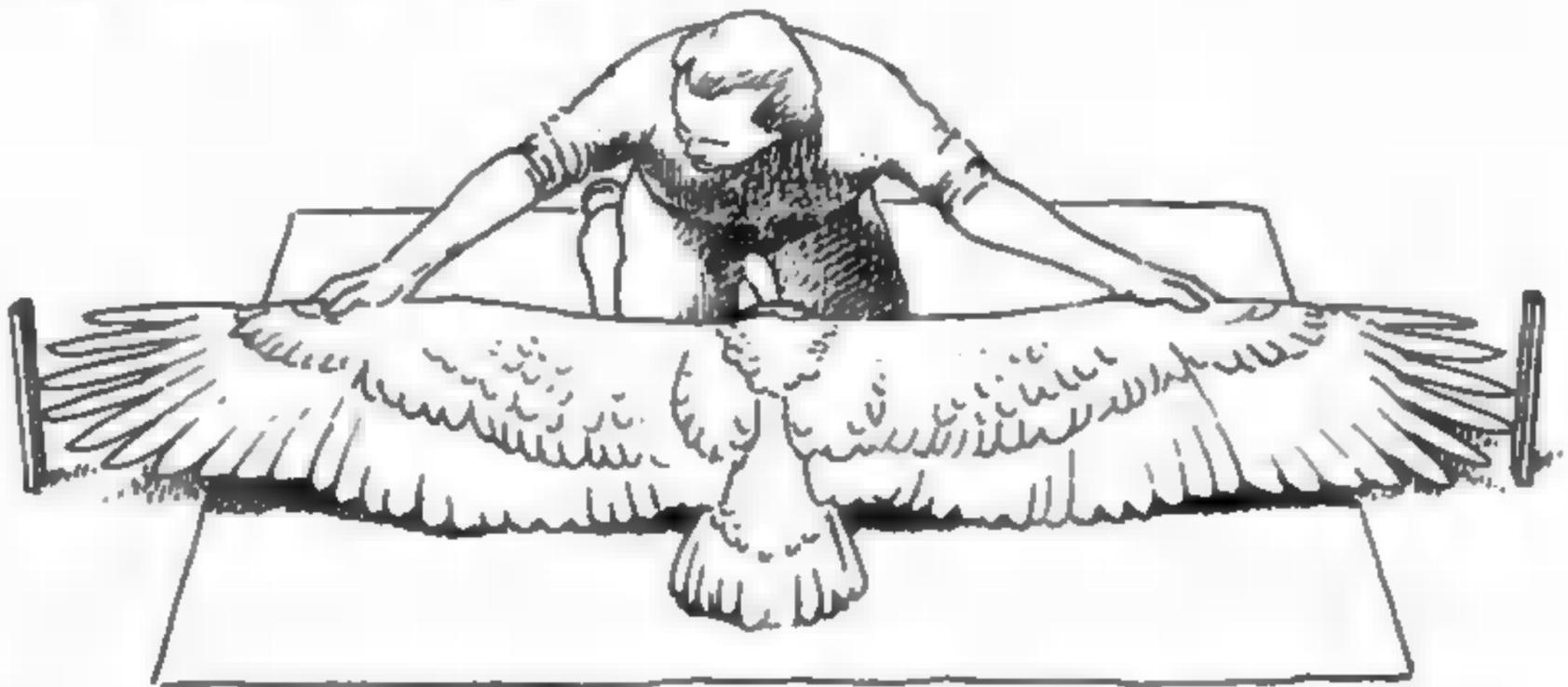


Fig. 10. Wingspans of live or freshly dead birds may be measured by spreading the wings, holding them just above the carpals, and marking the positions of the wing-tips by means of pegs fixed in the ground; the distance between the two pegs is the span. (After Noakes)

Alternatively, a reliable half-span can be obtained (and then doubled) by holding the body or the thighs with one hand and an outstretched wing just above the carpal joint with the other; a rule anchored to the ground can be used to measure from the middle of the back to the tip of the wing (fig. 11). This method is, of course, much the easier of the two if the observer is working on his or her own.

All Noakes's measurements and his and our calculations relate to 'full natural spreads'. Larger spans can be forced by holding birds tightly at the tips of the wings or even, with dead birds, by pulling them to a full stop; but live raptors are not capable of stretching their own wings to this extent. To take some actual examples, a small male Northern Sparrowhawk (wing measuring 187 mm) with a natural spread of 56 cm

was easily stretched to 59 cm (effectively increasing the multiplier from 2.98 to 3.15); a female Peregrine Falcon (wing 352 mm) from 103 cm to 107 cm (multiplier 2.92 to 3.05); and a Red Kite (wing 503 mm) from 160 cm to 166 cm (multiplier 3.18 to 3.31). Even so, the difference between a natural spread and the full stretch varies from only about 1–2 cm on the smallest raptors to about 8–10 cm on the largest.

When measuring the spans of dead birds, it is important that they be fresh corpses. A newly dead Wedge-tailed Eagle had a span of 201 cm, but this was easily extended to 208 cm some time later when it was in a state of 'wet' decay. In between, after it had been dead for a few days, it would not have been possible to spread the wings fully and the apparent span would have been well under 200 cm.

### WING SHAPES

It would have been useful to have been able to support statements in our text that wings are 'broad' or 'narrow', or somewhere in between, by giving for each species front-to-back ranges of measurements taken across the wing at the base and the carpal joint, but these figures are simply not available. Museum skins cannot be relaxed for obtaining such data, and David Noakes, to his great regret, did not think of measuring at least the breadth at the carpal joint when he began his wingspan project.

Another useful measurement is the distance, on the folded wing, between the tips of the longest primary and of the first secondary. The standard wing length divided by this wing-tip figure – known as the Kipp Index, because it was used by Kipp (1959) for demonstrating wing-shape differences between resident and migratory birds of various species and subspecies – beautifully illustrates, in combination with the wing/tail index, the varying abilities of different raptor genera to manoeuvre in dense forest as against soaring in open country (Carl Edelstam *in litt*).

Made available for all raptors, these two sets of data would help better to quantify differences in wing shape and general proportions, but obtaining them they will have to be tasks for researchers in the future.

### TAIL LENGTHS

Tail lengths follow the standard measurement from the emergence point of the central pair of feathers to the tip of the longest. In flight, however, the tail is seen as the part which extends beyond the trailing edges of the wings or, when closer, beyond the tail-coverts. Thus, its apparent length is variably affected by the breadth of the wings and the length of the coverts; the actual tail projection will be shorter than the figures quoted.

### SUMMARY

All the measurements of total length, wingspan and tail given opposite the plates are expressed as ranges in centimetres, each with a rounded median equivalent in inches. Total lengths are from the top of the head to the tip of the tail. Wingspans are based on natural spreads. Tail lengths are measured from the base.

In all cases, these measurements relate only to adults or subadults. Many juvenile raptors have a longer tail than do adults, and some have longer or shorter wings; a few have a much shorter tail, while those of certain groups have narrower wings (for example, most *buteos*) or broader wings. To have included these variations in the ranges given would have had a distorting effect.

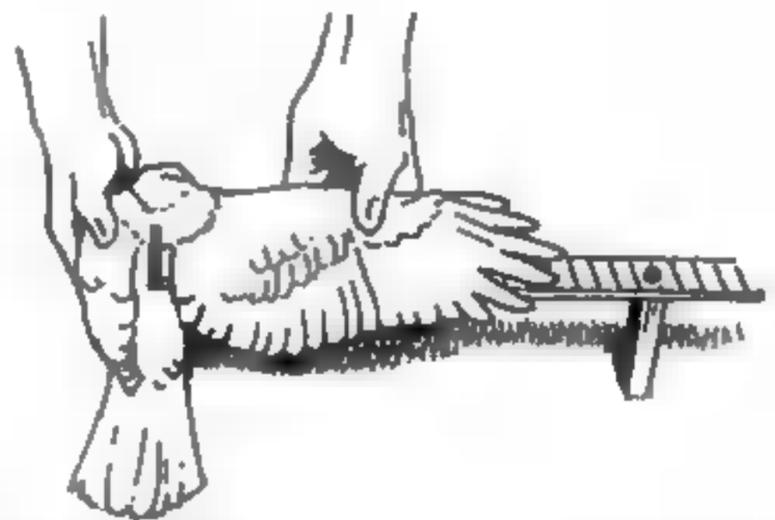


Fig. 11. An alternative method of measuring wingspan: with the raptor's body held in one hand and an outstretched wing in the other, the distance from the middle of the back to the tip of the wing can be measured by using a rule secured firmly to the ground; this half-span can then be doubled to give the full span. (After Noakes)

# SEX AND AGE DIFFERENCES IN SIZES AND SHAPES OF RAPTORS

People often assume that, apart from differences of sex or age, individual birds of any one species fit a standard mould. Moreover, since most young birds have more or less reached their full size by the time that they can fly (there are exceptions), it may seem that not even they have to grow like other classes of vertebrate animals. (In fact, they go through the same stages, but very quickly: single cell to full size in ten weeks to ten months, depending on the species.) But birds in general, and not least the raptors, do differ individually in size, shape, plumage and behaviour.

Of particular concern here, too, the sizes of many birds of prey vary to differing extents with sex, and their shapes more subtly with age; certain of these differences have implications in field identification, and it is also worth considering the selective pressures that may have brought them about.

## REVERSED SEXUAL DIMORPHISM (RSD)

For most bird species, the males are much the same size as, or slightly to noticeably larger than, the females. The same applies to the other higher vertebrates, although the reverse is true for some bats (Myers 1978) and certain other mammals (e.g. Ralls 1976). Among birds, one heterogeneous group of mainly ground-feeding exceptions to the general rule, with the females the larger, occurs where there is polyandry (more than one male mated to each female) or a reversal of sex role: examples include the Neotropical tinamous (Tinamidae), the Old World buttonquails (Turnicidae), and the jacanas (Jacanidae), phalaropes *Phalaropus* and some other waders where the male takes care of the young.

The second and no less heterogeneous group of exceptions consists of a wide variety of mainly aerial hunters, including the predatory frigatebirds (Fregatidae), boobies (Sulidae) and skuas (Stercorariidae), the males of which are all smaller in weight rather than in linear measurements, together with most of the owls (Strigiformes) and, often much more strikingly, many of the diurnal raptors.

The males of some of the seven cathartid vultures of the New World, now known to be much more closely related to the storks (Ciconiidae) than to the other raptors ['Taxonomy, sequence and nomenclature of raptors', pp. 69-75], and of the unique Secretarybird *Sagittarius serpentarius* of Africa, which feeds somewhat like a stork on relatively small ground prey, are actually larger than the females. In contrast, every single one of the accipitriform and falconiform species that make up the vast majority of the diurnal-raptor group shows at least a tendency towards reversed sexual dimorphism (RSD), even if the measurements and weights of the sexes of, for example, the Old World vultures almost entirely overlap. At the extreme end of the scale, RSD is at its most marked in a number of accipiters and a few falcons whose males are well under two-thirds the bulk of the females.

In this book, as part of the data on proportions opposite the plates, a degree of RSD is calculated for each species from the middle of the ranges of the wing lengths of the two sexes: these figures are cubed, to give more of an idea of the difference in mass, and the male product is then expressed as a percentage of that of the female.

There are obvious disadvantages in using linear measurements as a basis for showing sexual differences in mass. Many cubed wing-length percentages correspond to a greater or lesser (but often reasonable) extent with those of known weight ranges, but there are marked exceptions: an extreme example of where they do not is provided by the Lesser Kestrel *Falco naumanni*, whose wing-length dimorphism is over 99%, while a figure based on weights appears to be about 75%. Weights, however, are subject to marked seasonal and diurnal variations and, in any case, are available in any quantity only for relatively few raptors. Further, if aerial agility is an important factor in the development of RSD, as discussed later on, then wing lengths (and wing-loadings) are likely to be as important as actual weights. The problems of measuring RSD have been discussed by, for example, Amadon (1977) and Cade (1982).

In view of the link with food categories, outlined below, it might be argued that the sizes of the feet, which grasp the prey, would be a better basis for calculating dimorphism than would wing lengths, but Hill (1944) and others have shown that the tarsi are generally less dimorphic than the remaining standard measurements. Incidentally, and as noted by Ratcliffe (1980, 1993) for the Peregrine Falcon *Falco peregrinus*, it seems that the two sexes also tend to be similar with regard to the size of the eyes, and so these can appear larger on a much smaller male.

Over the years, numerous hypotheses have been advanced to explain RSD in raptors. One clear relationship is with food categories. Enlarging upon Hill's pioneer paper, IJF-L was among the first to show this at a conference at the Edward Grey Institute, Oxford, in 1950 (*Ibis* 92: 342), using a wall-chart six metres long that plotted the food categories and the mid-range wing measurements of both sexes of almost all species and many races of raptor – a total of nearly 600 taxa – in order of increasing RSD.

To summarise, the degree of RSD in diurnal raptors is closely related to food specialisation. The raptors which feed exclusively on meat that is in the form of carrion have the sexes almost the same size (or even the males slightly the larger among the quite distinct New World cathartid vultures, which are, as we have seen, more closely related to the storks). At the other end of the scale, those which feed largely or exclusively on birds, or on fast-moving mammals that are big in relation to their own body size, show the greatest RSD. In between lies a whole range of other species, among which the specialist feeders tend to form distinct groups.

Thus, in general terms (there are minor exceptions), the specialist carrion-feeders and those that hunt exclusively on foot show the least RSD, followed by those that eat mainly but not entirely carrion and other motionless prey. Next come raptors that feed largely on snails, worms or terrestrial insects, often by still-hunting from perches; then the aerial insect-eaters and, again chiefly through still-hunting, the amphibian-eaters and the reptile-eaters. Those that take terrestrial vertebrates by hovering, those that snatch fish and arboreal vertebrates, and those that chase terrestrial mammals or catch birds on the ground tend to show increasingly clear RSD, and this is most obvious among the specialist bird-eaters, particularly those that actually take most of their prey in flight or after prolonged pursuit. Dimorphism increases with the speed and agility of the prey, and is greatest among the smaller raptors whose hunting depends on aerial dexterity.

A discussion of the apparently direct relationship with prey was developed by Newton (1979), who plotted the foods of some raptors against wing-length ratios (using female over male). He concentrated first on the 25% of species that are food specialists with restricted diets, and showed that the same trends hold within the individual genera of *Falco* and *Accipiter* as among the diurnal raptors as a whole. He then compared with the strict specialists some slightly more general feeders that take two main categories of prey, and found that they were always intermediate in their degree of dimorphism. For example, falcons that take a mixture of insects and birds are intermediate between those that feed almost exclusively on one or the other (but see later). The atypical frog/reptile-eating accipiters are less dimorphic than the bird-eaters. Old World vultures that take some living prey are more dimorphic than those that live on carrion alone.

As a further specific example of mixed diet, the Palmnut Vulture *Cypohierax angolensis* might be expected, as the only primarily vegetarian raptor, to show virtually no sexual size dimorphism, but males are actually slightly smaller (92%) and a part of the prey consists of fish, amphibians, and crabs and other invertebrates.

The two supposedly specialist crepuscular bat-eaters differ greatly in the degree of dimorphism that they exhibit. The male Old World Bat-hawk *Macheiramphus alcinus*, kite-like in some respects and generally placed with the kite group in systematic order, is smaller than the female (83%) but with a slight overlap, whereas the American Bat Falcon *Falco ruficularis*, which is a faster hunter and, as discussed later on, takes mainly birds and many large flying insects, shows the most marked RSD (61%) of any falcon.

In this connection, while the Northern Sparrowhawk *Accipiter nisus* has often been credited with the greatest RSD of all, the percentages used in this book, based on mid-range wing lengths, indicate that nine other mainly bird-eating accipiters have the difference even more marked.

Since Schmidt-Bey (1913) first sought to explain RSD in terms of territorial defence, a vast literature on the subject has grown up, including the contributions of nearly 60 authors listed at the end of this chapter. Yet we still do not fully understand how or why natural selection has worked in this way.

Some writers have concentrated on a single factor or group of factors as the supposed primary key to the evolution of RSD. Others argue, probably correctly, that many of the alleged selective pressures, such as some of the differences in the breeding roles of males and females, the significance of dominant females, and the advantages of any differences in diet where the size discrepancy is really marked, are effects and not causes. Even the strong food link may not, in itself, be causal. There is also disagreement on whether male raptors have become smaller while females have remained the same, or whether females have grown larger and males remained the same, or whether both have diverged. It is a highly complex subject.

Aerial agility and the separate roles of male and female raptors in the breeding season do, however, seem likely to be central aspects. In very general terms (and there are various partial exceptions, even among the more markedly dimorphic groups), the male advertises the territory and provides the food during pre-breeding, egg-laying, incubation, and the first half of the nestling period; the female defends the nest, incubates the eggs, and protects and feeds the young. A small male will need less food for himself; a large female will be better able to fend off predators. The smaller the prey the male goes for, the more variety and density will be available to him; small prey can also be taken and delivered more frequently than large prey, which is important during courtship feeding as well as, particularly, when the young themselves are small and cannot withstand prolonged hunger.

The significance of female social dominance during the breeding season has often been put forward as a key factor and, as often, dismissed by others. In fact, the females of many bird families tend to be the dominant partners after the pair has been established, even when the male is the larger, but among raptors both sexes are awesomely armed with sharp bill and talons. It has been suggested that, were they evenly matched in size, the female's need to dominate could easily result in injury (e.g. Cade 1982, Smith

1982). Yet the male's smaller size may be self-defeating, as there are records of female Northern Sparrowhawks eating males (Newton 1979). In any case, as with many of the other hypotheses, is female dominance a cause or an effect of RSD?

Among the more comprehensive reviews of the problem in the last two decades have been those of Newton and, together or individually, Andersson and Norberg, and Mueller & Meyer. Norberg (1987) emphasised the need to consider first what is special about the differences in the roles played by the two sexes during the breeding season and why any size dimorphism is reversed at all; why the male is the food-provider and why the degree of dimorphism has a link with the type of food; and what the advantages of the varying degrees of RSD are and why they do not apply to other groups of birds. Like Andersson & Norberg (1981) and Newton (1986), he noted the likelihood of the underlying causes being linked to aspects of breeding and to prey choice at that season. He thought that the separation of nesting and hunting duties might have arisen partly from the need for predatory birds, with their specialised structural and behavioural adaptations for killing, to be more successful than other birds of similar size in defending the nest; and partly, since vertebrates react to predators, because one bird hunting such animals in a territory was likely to be almost as successful as two when the second might often be searching among prey alerted by the first.

Norberg then considered why the male hunts and has remained or has become the smaller, while the female stays near the nest and has remained or has become the larger. Possible reasons for this role separation were the risk of damage to developing eggs inside the female during hunting; the added weight during egg production reducing her flight performance; that she had of course, in any case, to be at the nest for egg-laying; and that courtship feeding in the form of early presentation of food helped her to accumulate and conserve energy. The direction of size dimorphism might then perhaps be explained by the female's having to produce eggs, incubate, and carry out much of the defence of the nest and, later, the dividing-up of food for the young.

Among possible reasons for the differing degrees of dimorphism, as set out by Norberg, aerial agility was foremost. Apart from terminal diving speed, 'a small bird does better than a larger, but geometrically similar one' in several respects: these include maximum acceleration and speed in flapping flight, maximum rate of climb, maximum angular-roll acceleration, and turning ability. Since the male does most of the hunting during breeding, he is more strongly selected for small size. 'The more agile the prey is, the closer the predator should approach the lower size limit below which subduing and transporting the prey become difficult. The more fast-moving mammals and birds the predator takes, the stronger the selection for small size becomes.' A small male also uses less energy than a large one, particularly in active chasing.

Norberg went on to consider that, at other stages of the cycle, food competition between the pair-members might be expected to encourage a sexual difference in the sizes of prey taken. This might apply particularly to the bird specialists, some of which have relatively narrow ranges of prey species that they can carry as well as outfly. Among bird-eaters, a greater variety of prey would theoretically be available, with decreased intraspecific competition, if the sexes were markedly different in size and taking different ranges of prey.

In fact, real differences between the two sexes in prey species taken have been found for only a very few highly dimorphic accipiters (Höglund 1964, Snyder & Wiley 1976, Kenward *et al.* 1981, Newton 1986), while other researchers have detected no such differences for the same species (Mueller & Berger 1970, Wirlén 1984). From a slightly different angle, it has been shown for two harriers *Circus*, four accipiters and one or two large falcons that females constantly take heavier prey (Cade 1960, Storer 1966, Schipper 1973, Opdam 1975). Any such differences seem likely to be explained as an effect, rather than a cause, particularly when, as we have seen, the feet used in capturing prey are proportionately less dimorphic than is the rest of the body. Indeed, it may be that any differences in prey taken are as much the result of habitat segregation, since female American Kestrels *Falco sparverius* and Northern Sparrowhawks tend to hunt in more open habitats than those used by the males of those species (Koplin 1973, Marquiss & Newton 1982).

Earlier, reference was made to the intermediate degrees of RSD shown by some falcons. Thus, Eleonora's *Falco eleonora* (84% on cubed wing lengths) and Sooty Falcons *F. concolor* (88%) are the classic examples of insectivorous falcons that feed their young on birds, in their cases breeding late in the year to coincide with the rush of Palearctic migrants en route to Africa. The Northern Hobby *F. subbuteo* (88%) is another substantially insectivorous migratory falcon whose Palearctic breeding season is timed to coincide with plentiful supplies of hirundines, swifts *Apus* and other birds, especially inexperienced juveniles. The no less insectivorous African Hobby *F. cuvieri* (81%) similarly depends on birds in the breeding season.

Yet, if the breeding season is the time of main influence on RSD, why are the sexes of these species that are then specialist bird-eaters not more markedly different in size? The Bat Falcon is another that takes many birds and insects, and usually less than 15% bats, and yet it is, at 61%, the most highly dimorphic of all falcons. Why is it peculiar? It seems just possible that the precise period when birds are the main prey is significant.

The first four falcons listed above are substantially insectivorous until their young hatch. At least in southern Mexico, on the other hand, the Bat Falcon appears to take most birds at about the time the eggs

are laid and, later, to raise its young on the abundance of dragonflies available in the rainy season (Falxa *et al.* 1977). Does this highlight the egg-laying and early incubation periods as the vital part of the breeding season so far as the relative sizes and agility of the adults are concerned? Possibly, as we shall see.

Some of the hypotheses mentioned are doubtless part of the story, but some may equally be applied to birds of other groups. It has also been argued that, because they invest so much energy in the breeding season, males might be competed for by females (the reverse of the norm). Female size would thus tend to increase in favour of greater strength in obtaining mates, and smaller males to be selected for their superior ability in providing food (see Cade 1982, Safina 1984, Olsen & Olsen 1984, Newton 1986).

This suggests a divergence in size by both sexes. On the other hand, Wheeler & Greenwood (1983) argued that the male has remained the appropriate size for the dietary specialisation of the species, while the female has grown larger. They supported, by various correlations, their hypothesis that the constraint on female flight performance before egg-laying was the key factor in the evolution of RSD. Through enlargement of the ovaries, taking on food reserves for egg production and incubation, and actually developing the eggs, female raptors probably increase in weight by up to 15% during the period before they lay: female Northern Sparrowhawks, for example, increase from around 300 g to 340 g, producing an increase in wing-loading of about 10%, with the result that, in the last few days before laying, they may be so incapacitated as to have some difficulty in flying (Newton 1979).

Wheeler & Greenwood postulated that, were the female the same size as the male, the wing-loading increase for producing eggs of similar size would be about 20%. A larger and more powerful female would experience less alteration and more gradual change in her wing-loading and power:weight ratio, and therefore less impairment of flight performance in carrying increased weight before she became dependent on the male.

Egg weight as a proportion of body weight is strongly related inversely to body size in raptors (Lack 1968). A large female also 'produces larger eggs, which hatch out larger chicks better able to survive than small chicks; owing to her greater thermal insensitivity to cold weather, she can lay earlier in the season than a small female, and she is a more efficient incubator; she is also more effective in nest defence; and she can store more energy and, when necessary, fast for a longer time during incubation and care of nestlings than a smaller female' (Cade 1982).

It should be added that statistical relationships can be established between degrees of RSD and, for example, territory size, solitary or gregarious behaviour, clutch size, latitude, temperature and climate, and so on: the list is open-ended. For instance, gregarious and colonial raptors tend to show little RSD, but this may be because, in general, they are the birds that specialise on carrion or insects. Again, the aerial insect-eaters, which show relatively little RSD, and the specialist bird-eaters, which show much, appear to have bigger clutches than the intermediate mammal-eaters, which in turn lay more eggs than the reptile-eaters and carrion-eaters: this may be related to the availability of different foods for the young, or even to the sequence in which raptors have adapted to the different degrees of difficulty in catching the various prey groups.

Which are the chickens and which the eggs? No hypothesis has yet really satisfied what Newton (1979) termed 'one of the most intractable problems in raptor biology'.

Norberg considered that the 'first and most important requirement on a theory explaining the evolutionary origin of reversed sexual size dimorphism is that it should apply to...raptors, owls and skuas alike'. But, in that case, why not to the frigatebirds and boobies, and why not to other predatory groups whose dimorphism is not reversed? Indeed, in view of structural and behavioural differences among raptors, owls and skuas, it does in fact seem preferable to look at the diurnal raptors in isolation. There is no reason why different factors should not be responsible for parallel or convergent adaptations in unrelated families.

One can argue further against seeking an all-embracing answer: while most of the families of rapacious birds that pursue vertebrate prey, including the piratical frigatebirds and skuas, and the plunge-diving boobies, show at least a degree of RSD, this is not universal. If the boobies, why not the terns (Sternidae)? If the skuas, why not the gulls (Laridae)? Some Great Black-backed *Larus marinus* and other large gulls are not just piratical but truly predatory, even if only seasonally, but the males are invariably the larger. In fact, boobies and most skuas, like terns and gulls, do not have marked role separations during breeding, both sexes incubating and feeding or guarding the young.

Various other groups that feed almost entirely on the wing, such as the swallows (Hirundinidae), swifts (Apodidae) and nightjars (Caprimulgidae), need aerial agility and a high flight performance even though they are insectivorous, but, again, show no suggestion of RSD. They also have no marked role separations. The greatest anomaly of all, however, is provided by the true shrikes (Laniinae). They have the characters of a hooked bill, strong feet and sharp talons to make them the passerine equivalents of the diurnal raptors, with comparable spectra of hunting methods and prey; unlike most other passerines, they will even carry large prey in their feet. Various species still-hunt to the ground, dash at passing prey, hover, or search for prey on the wing in other ways, even chasing like an accipiter along the sides of cover. Both

sexes of some shrike species build nests and incubate, but, like raptors, the males of others bring food to the female and young. Some specialise on insects, others on lizards, and others still on mice and small birds, but all have similar degrees of standard sexual size dimorphism, with the male slightly the larger, the female presumably becoming heavier only during ovulation. Why are shrikes so different?

### JUVENILE DIFFERENCES IN SIZE AND SHAPE

As noted at the heads of the texts facing plates 1–3, adults and juveniles of some species have different proportions. In a few cases, this difference is quite marked. Where there are differences, the general tendency is for juveniles to have slightly shorter wings, which may also be broader, and a slightly longer tail. Juveniles of the larger species also have more pointed quills, resulting in serrated trailing wing-edges, while juvenile falcons have softer and more flexible flight-feathers.

There are many exceptions. The really long-tailed species, notably the Swallow-tailed Kite *Elanoides forficatus* of the New World and the Long-tailed Hawk *Urotriorchis macrourus* and Secretarybird of Africa, have a much shorter tail as juveniles, as do the longish-tailed honey-buzzards *Pernis* and African Scissor-tailed Kite *Chelictinia riocourii*. The really short-tailed species, of which the Bateleur *Terathopius caudatus* is the obvious example, have a conspicuously longer tail as juveniles.

The juveniles of some buzzards *Buteo* and other buteonines have narrower wings than the adults, and those of most larger falcons have longer wings; juveniles of the kestrel and hobby groups, on the other hand, have both wings and tail slightly shorter. Whereas the tail and wings of most juvenile Old World vultures are much the same lengths as those of adults, or even slightly longer, young Egyptian Vultures *Neophron percnopterus* are significantly shorter in both respects.

Juveniles with broader wings include the fish-eagles *Haliaeetus*, some typical eagles *Aquila*, and the Lammergeier *Gypaetus barbatus*. Many of these, particularly the fish-eagles, tend at the same time also to have longer wings and tail as juveniles [*Raptor moult patterns and age criteria*, pp. 50–53], so that the proportions remain roughly the same.

Presumably, these often rather small differences relate to wing-loading and flying expertise. In general, juvenile raptors apparently also weigh less than adults once they have been out of the nest for some time. Shorter and broader wings may compensate for weaker flight and less developed pectoral muscles. A longer or shorter tail may compensate for poorer flying efficiency.

This subject has been discussed for the falcons by Cade (1982), who, however, went on to describe the very efficient flight of a hybrid Peregrine x Gyr Falcon *Falco peregrinus* x *rusticolus* bred in captivity: this bird had the left wing and the left-hand side of the tail 20–25 mm (almost an inch) shorter than the right, but apparently suffered no impediment in flying.

### EFFECTS IN THE FIELD

So far as field identification – the prime object of this book – is concerned, RSD plays only a small part. Size can be notoriously difficult to estimate in the field, unless there is a direct comparison, and with single individuals in general it is possible to sex only some of the accipiters and falcons by size alone. Even then, a large male may not be conspicuously smaller than a small female. With some of the most difficult genera, however, and *Aquila* and *Accipiter* are obvious examples, a small male and a large female can look sufficiently different in size for the unwary to think that they may be looking at two different species.

On the other hand, the seemingly more subtle differences in shape of wings and tail between some juveniles and adults can cause problems for anyone inexperienced with the species concerned. A Lammergeier with broader wings and a longer tail, honey-buzzards with a tail 10% shorter, fish-eagles with a tail 10% longer and jagged trailing wing-edges, and, in Africa, not least a brown Bateleur with an obvious tail: all begin to have awkwardly different outlines. Shape can be particularly important in the identification of *Aquila* and *Buteo*, and even slightly broader or narrower wings may cause confusion.

### SELECTION OF PUBLISHED WORKS ON RSD

The following, here listed in date order, are all included in the main list of references at the end of the book: Hill (1944), Rand (1952), Storer (1955, 1956), Amadon (1959, 1975, 1977), Cade (1960, 1980a, 1982), Perdeck (1960), Höglund (1964a), Selander (1966, 1972), Earhart & Johnson (1970), Mueller & Berger (1970), White & Cade (1971), Reynolds (1972), von Beusekom (1972), Schipper (1973), Mosher & Matray (1974), Opdam (1975), Snyder & Wiley (1976), Balgoyen (1976), Wrege & Cade (1977), Newton (1979, 1986), Walter (1979b), Anderson & Norberg (1981), von Schantz & Nilsson (1981), Sigurjonsdottir (1981), Yom-Tov & Ar (1982), Nilsson & von Schantz (1982), Smith SM (1982), Wheeler & Greenwood (1983), Safina (1984), Widén (1984), Jehl & Murray (1985), Lewin (1985, 1988), Temeles (1985, 1986), Mueller & Meyer (1985), Mueller (1986, 1989), Korpimäki (1986), Lundberg (1986), Bowman (1987), Mendelsohn (1986a/b), Olsen & Olsen (1987), Norberg (1987), Pleasants & Pleasants (1988), Longland (1989), Montgomerie & Lundberg (1989), Olsen (1989, 1990a/b), Ydenberg & Forbes (1991), Bildstein (1992), Anderson *et al.* (1993a/b), Schaadt & Bird (1993), Bortolotti & Gabrielson (1995), Boal & Mannan (1996), Hakkarainen *et al.* (1996), Sodhi (1996), Bortolotti (1996), Olsen *et al.* (1998), Massemin *et al.* (2000).

# IDENTIFYING RAPTORS

Raptors can be among the most difficult of all birds to identify. Some are easy because of striking patterns, shapes or behaviour, or because the local alternatives are few, but certain groups are so notoriously complex that even the most experienced raptor-watcher must not expect always to be able to put a name to every individual, especially in the tropics or on migration routes.

An initial clue can sometimes be provided by the type of habitat in which the raptor is seen. Some species spend all of their time in fairly dense forest, others in more open woodland, while others again are characteristic of open country or sparsely vegetated mountainous habitats. In the case of migratory species, however, any association with a particular habitat type becomes largely irrelevant, as such raptors then may be seen flying over just about any kind of country on their way between breeding and non-breeding quarters.

The plumages of some species differ widely at various ages, and the juveniles and other immatures are often more difficult (though in a few cases easier!) to identify than the adults. Flight shapes also vary, mostly slightly, between adults and juveniles and, more significantly, can look surprisingly different in differing conditions of wind or updraught and depending on whether the bird is gliding or soaring or actively flying. Often, too, a raptor will be seen only briefly and not nearly so closely as one would like.

Yet, although certain species or genera of such diverse families as gulls (*Laridae*), pigeons (*Columbidae*), cuckoos (*Cuculidae*) and crows (*Corvidae*) may sometimes momentarily be mistaken in flight for raptors, and soaring pelicans (*Pelecanidae*) and storks (*Ciconiidae*) can look like large vultures or eagles when they are too distant for their long bill or neck to be visible to the naked eye, even relatively inexperienced observers usually have little difficulty in knowing at once that a bird is 'a raptor'.

The first real stage, depending on the part of the world you are in, is deciding whether the raptor you are looking at is a vulture of one sort or the other, a honey-buzzard or kite, a fish-eagle, a snake- or serpent-eagle, a gymnogene, a harrier, a chanting-goshawk, an accipiter or accipitrine, a buteo or buteonine, a true eagle, a caracara, a forest-falcon, a pygmy-falcon or falconet, or a typical falcon. (Remember, too, that taxonomists are not yet always able to agree on the relationships of certain species.)

## PERCHED RAPTORS

Unlike most birds, many raptors are often hardest to identify when they are perched. The beginner frequently starts by commenting on yellow cere and legs or feet, but a great many raptors have these bare parts very obviously yellow (so much so that, in general, the caption texts opposite the plates in this book refer only to colours other than yellow for cere and legs or feet).

The first points to look at on a perched raptor of unknown identity are shape and proportions: the length, depth and other details of the bill (including, if possible, the shape and position of the nostrils and the extent of the gape-line); the size and shape of the head, and whether any part of it is bare; the form of any crest; the bulk of the body; the length of the tail; whether the legs are bare or feathered and, if bare, whether thick or slender; the length of the toes; and, not least, because it can be a useful pointer, the position of the wing-tips in relation to the tail-tip. A combination of several of these features should, with a little experience, enable at least the genus or group to be determined. Let us look at some examples.

Though raptors in general have a hooked bill, the shape, length and depth of the bill and the extent of the hook-tip vary greatly. The American snail-eating kites *Rostrhamus/Chondrohierax* have an elongated and very decurved hook-tip, and the bill of *Rostrhamus* is particularly slender, too. At the other end of the scale, the bills of some of the fish-eagles *Haliaeetus* and true eagles *Aquila* are strikingly heavy, while those of the east Asiatic Steller's Fish-eagle *H. pelagicus* and of the Philippine Eagle *Pithecophaga jefferyi* – one of the tropical harpy eagles – are massively deep and arched. The bills of vultures (of both the totally unrelated New and Old World groups), though mostly big and in some cases very big, are generally far less hook-tipped, while those of the smaller species are relatively long and slender. The cutting edges, or tomia, of the upper mandible of many accipitriforms are more or less straight, though some (e.g. the goshawks/sparrowhawks *Accipiter*) have a slight tooth-like projection, while Neotropical kites of the genus *Harpagus* have two such 'teeth'. Among the falconiforms, the bills of most falcons *Polihierax/Microhierax/Falco* are rather like those of shrikes (*Laniidae*), with a more pronounced tooth-like projection and a corresponding notch on the lower mandible.

Among what are loosely termed 'eagles', though the main groups are quite unrelated ('English names of raptors', pp. 76–79), the largely Afrotropical snake-eagles *Circus* and the southeastern Asiatic serpent-eagles *Spilornis* have a smallish bill, a large-looking head, and long, slender, bare and roughly scaled tarsi (defence against venom) with short toes and claws. Fish-eagles have a long deep bill, a longish neck, short stout tarsi feathered at the base, and large feet and talons. The four monotypic genera of tropical harpy eagles have a deep to very deep bill, long or short bare lower tarsi, and mostly powerful toes with

long talons. True eagles of the genera *Aquila*, *Spizaetus*, *Hieroaetus* and so on have a moderate to deep bill, fully feathered legs, and mostly strong toes with long talons.

The legs of the harriers *Circus*, chanting-goshawks *Melierax*, some accipiters, buteonines and forest-falcons *Micrastur*, and the Crested Caracara *Caracara plancus* are obviously on the long side; of the Secretarybird *Sagittarius serpentarius* exceptionally long; and of the gymnogenes *Polyboroides* and the apparently unrelated Crane-hawk *Geranospiza caerulescens* adaptively double-jointed, too. In very general terms, raptors that eat terrestrial mammals and birds tend to have shorter thicker legs with powerful toes and strong claws; those that eat small birds have longer legs and toes with sharp curved claws; snake-eaters possess long or short but always heavily scaled legs, short toes and short curved claws; and fish-eaters have short legs, specially adapted feet and, again, long claws. Carrion-eaters and scavengers have short legs and straighter blunter claws, and the specialised vespertine-excavating honey-buzzards *Pernis* also have shortish legs and only slightly curved claws.

Almost all the vultures (again of both the American cathartid and the Old World accipitrid groups) have a more or less bare head, some with caruncles and corrugations, because their comparable feeding habits involve exploring the insides of dead animals. The few other species or groups with areas of bare skin on the head are the Afrotropical Palmnut Vulture *Cypohierax angolensis*, which is not a true vulture (bare orbital region, lower cheeks); the Bateleur *Terathopius ecaudatus*, a specialised snake-eagle of Africa, and the serpent-eagles of southeast Asia (lores); the Afro-Malagasy gymnogenes or harrier-hawks and the African Secretarybird (sides of face); and most caracaras of the genera *Phalacrocorax* and *Caracara* (lores or sides of face) and *Daptrius* (whole face, throat), which are all confined to the New World.

Various bazas or cuckoo-hawks *Aviceda*, honey-buzzards, and South American or African eagles of the genera *Morphnus*, *Harpia*, *Spizaetus*, *Stephanoaetus* and, most conspicuously, *Lophastur* have a quite long and distinctive crest; so does the Secretarybird. The almost cosmopolitan Osprey *Pandion haliaetus* has a short crest, and other erectile head-leathers are found on the snake- and serpent-eagles, including the Bateleur, as well as on the Egyptian Vulture *Neophron percnopterus*, various other big eagles, some accipiters, and the Australasian hawks of the genus *Erythrotriorchis*. [Some of these heads are used in the selection shown in fig. 9 on p. 30.]

The position of the folded wing-tips in relation to the tail-tip can be quite useful. On some species or groups of raptors, they reach or exceed its tip; on others, they extend perhaps half or three-quarters of the way down the tail; on others still, especially forest species, they barely cover the base. At one end of the scale, the open-country Bateleur has long wings and a very short square tail, so that its wing-tips well exceed the latter when perched (and even the toes project in flight). At the other, the graduated tail of the Long-tailed Hawk *Urotriorchis macrourus*, a secretive denizen of tropical African rainforest, accounts for well over half the bird's total length.

In between is a wide range of wing/tail ratios and differing lengths of tails with squared, rounded, graduated, or slightly or deeply forked ends, plus the Secretarybird which has elongated central feathers. [Some idea of the variety of tail shapes can be obtained from fig. 4 on p. 28.] Within many families, or at least genera, all members tend to have tails of broadly comparable proportions, the accipiters being a case in point (though there are differences even among those), while the tails of the buteos and falcons vary chiefly in length. On the other hand, the kites show a considerable variety of lengths and shapes; and the tails of some vultures, fish-eagles and eagles are also quite different from those of their allies. Tails of terrestrial-feeding carrion-eaters can also easily become abraded by dragging on the ground, which makes them shorter and more ragged, often looking squarer-tipped.

(So far as possible, both the main and the caption texts attempt to state the relative positions of wing- and tail-tips, basing this on photographs, published statements and our own experience, but note that knowledge of this as a field character has developed considerably since the late 1980s and, in some cases, the plates themselves do not show the correct positions.)

Raptor plumages vary from entirely white through grey and rufous to brown and solidly black. Many species have the adults grey above and more or less barred below, and the juveniles brown above and streaked below, but there are numerous variations on this theme. Some species also have a range of generally rarer colour morphs, especially dark and rufous, that vary to differing degrees from the normal (usually 'pale'). A few have small areas of bright colours.

Before trying to find any perched raptor in the book, take a full description, including the shapes and forms of bill and legs, the proportions of wings, tail and any crest, and particularly note the colour of the eyes and, if present, the orbital rings, and whether the colours of the cere and legs are or are not yellow (perhaps red, orange, green, blue, grey or whitish). Note carefully the patterns of the head (especially supercilia, moustaches and so on), the back and the breast, and whether any bars or bands can be seen on the tail.

Not least, note whether the perch is high or low, exposed or hidden. Many buteos, for example, tend to use open perches, while most accipiters often settle within the canopy, though remember that exceptions

to these general tendencies are not infrequent. On the other hand, some of the buteonine 'white hawks' *Iucopernis* are secretive, while the more accipitrine chanting-goshawks perch conspicuously on tree tops.

## FLYING

Perhaps surprisingly, raptors are often easier to identify in flight, which is just as well since that is how many of them are usually seen. The drawback is that they may be visible for only a minute or two at most. Therefore, the greatest possible amount of information should be written down during the sighting or immediately afterwards.

With a strange raptor in flight, concentrate first on proportions: the length, breadth and shape of the wings, whether the tips are pointed, rounded or 'fingered', and whether the trailing edge of each wing is more or less straight, S-curved, or pinched in at the body; the length of the tail in relation to the breadth of the wings from front to back [fig. 7 on p. 29], and its shape (graduated, rounded, squared, forked: fig. 4 on p. 28) both when closed and when spread; similarly, the amount of projection of the head and its shape. Also note how the wings are held in gliding or soaring: they may be flat, raised in various ways and to varying extents in a dihedral, or bowed or arched down (fig. 12). Hunting behaviour – for example, quartering the ground, attacking prey in flight or from a perch, and especially hovering – may also be of great significance.

Then concentrate on the underwing pattern, especially the presence of any pale windows in the primaries, the form of dark barring on the remiges, the presence of any patagial or carpal patches, and the tone of the wing-linings in relation to the flight-feathers; the pattern and number of bars or bands on the tail; and any bold markings on the head (supercilia, eye-stripes, moustaches) or body (throat/breast/belly contrast, belly-bands or blotches, and so on). If the upperside can be seen, look for any wing-panels, tail-bands, or other relieving features. But beware that patterns of many species vary individually as well as, of course, with age. If you have a good camera and a long lens, try to take a series of photographs showing different angles.

At this point, it may be useful to turn to plates 1–3, not least to gain an idea of the great variety of sizes, wing shapes and tail shapes [see also 'Raptor topography', figs. 4 & 7]. The wing positions there, however, have intentionally been somewhat stylised, and variations can better be judged from the species plates and facing caption texts.

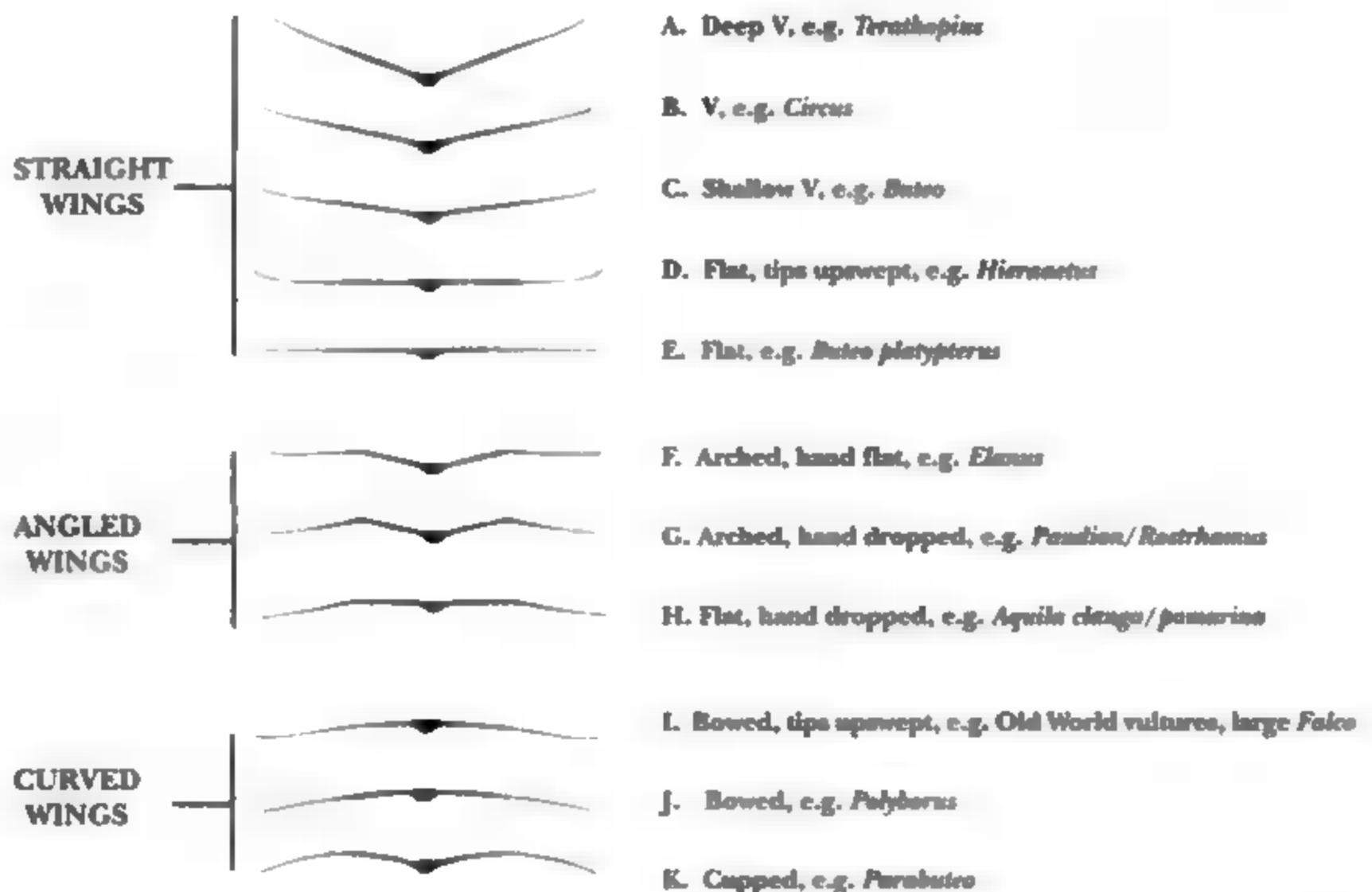


Fig. 12. Wing positions in gliding or soaring are valuable pointers in raptor identification. The wings may be held from above the body level (in a dihedral of varying angle) to below it (negative dihedral), and their surfaces may be straight (top five images, A to E), angled (F to H) or curved (I to K).

The largest raptors, including the true eagles (though not the harpy eagles of tropical forest) and the fish-eagles with their protruding head, as well as the relatively hunched-headed vultures, are built for soaring, with long, broad, 'fingered' wings: the exact wing shapes and head/tail proportions are very important for identification in some cases (especially *Aquila*). The *Buteo* species and related buteonines also soar a great deal, but have shorter wings and mostly a short broad tail and head. The unrelated honey-buzzards *Pernis* are slenderer, with a small head and longer tail.

The Osprey has kinked wings and a somewhat gull-like shape. Kites form a heterogeneous group with pointed or very round-tipped wings and a great variety of tail shapes, but in most instances a slow and buoyant flight. Even more buoyant are the harriers, with long slender wings in an obvious dihedral and rather a long tail, a combination of features that usually makes the genus *Circus* readily identifiable. Accipiters and other mainly forest groups have relatively short rounded wings and long tail, but even within *Accipiter* itself – the largest of all raptor genera – the shape of the spread wing-tips varies quite considerably; the flap-and-glide flight of accipiters can be very fast. The fast fliers in another large genus, the typical falcons *Falco*, have long pointed wings, a short to longish tail, and a big rounded or squared head. On the other hand, the falconiform caracaras (Daptriidae) are slow-flying with long, broad and mostly rather rounded wings, while the secretively arboreal Laughing-falcon *Herpetotheres cachinnans* and forest-falcons *Micrastur* have, like the harpy eagles and other forest raptors, short rounded wings.

## SIZE

Size is, of course, not always easy to determine in the field, and within some raptors it varies almost as much as the plumage.

It is well known that female raptors are in general larger (sometimes much larger) than males – in what is known as reversed sexual size dimorphism, or RSD – and this aspect is covered for each species in the first paragraph of the 'Field Characters' section of the species text and as a cubed percentage (in an attempt at quantifying difference in mass rather than in linear dimension) beneath the heading of the plate caption. But other, more subtle differences in size and, particularly, shape result from the tails of many juveniles being longer than those of the adults (or shorter on some species), while their wings also tend to be broader and shorter (or narrower on, for example, some buteos) [see 'Sex and age differences in sizes and shapes of raptors', pp. 35–39]. The more pointed quills of juveniles also produce more or less serrated trailing wing-edges, especially conspicuous on some of the large soaring species, such as the fish-eagles and the true eagles ['Raptor moult patterns and age criteria', pp. 50–53].

## VOICE

Some raptors are noisy and have highly distinctive calls. The loud ringing, almost laughing, yelps of the African Fish-eagle *Haliaeetus vocifer* are among the most characteristic sounds of Afrotropical watersides. Other examples from elsewhere in the world might include the whistle-cum-chatter of the Whistling Kite *Haliastur sphenurus* in Australasia, the scream of the Crested Serpent-eagle *Spilornis cheela* in southeast Asia, and the rhythmic and sometimes maniacal laughter of the Laughing-falcon in Central and South America.

Certain calls are somewhat generic in pattern, such as the mewling or squealing of many buteos and the hard high chattering of most falcons. Other groups, including all the vultures, some of the kites and, for the most part except when breeding, the typical eagles of the genus *Aquila*, are generally silent. Many of the hawk eagles *Hieraaetus* and *Spizaetus*, on the other hand, are highly vocal.

Most raptors are noisiest in pre-breeding displays or near the nest. For much of the time, therefore, voice does not play a significant part in identification, but for many of the high soarers and the forest species it can be very useful in attracting the observer's attention.

## CONCLUSION

By the time you have taken as much description as you can of a strange raptor, you should have a fair idea of the broad group to which it belongs. Look at the relevant plates of that group, see whether your notes agree with a particular raptor, and then check the confusion species.

It is much better, of course, to familiarise yourself, before you go to a new country, with the diagnostic characters of all the raptors that you are likely to see. This will enable you to identify each bird more quickly, and thus give you time to examine it 'at leisure' rather than 'in panic' during the short time that it is visible: go on looking at it, see what additional features strike you, and you will find it that much easier to pick out the next individual of the species to come your way. Gradually you will become familiar enough with some raptors to be able to identify them at long ranges.

If, after having taken as many notes as possible on all of the aspects mentioned above, you find that you are still uncertain of the identity of some of the raptors that you see, do not become disheartened. As stated at the very beginning of this summary, some groups are so difficult when it comes to identifying their individual members that even greatly experienced raptor-watchers can at times be baffled.

# RAPTOR MIGRATION

Anybody who has ever witnessed concentrations of migrating birds of prey can hardly fail to have been impressed by the sight. Such unforgettable spectacles have fascinated humans since earliest times and, indeed, the mass passages of *Aquila* eagles, buteos and other large raptors surely rival the terrestrial migrations of ungulates on the plains of Africa.

Excellent published accounts of raptor migration can be found in *The Migrations of Hawks* (Heintzelman 1975) and *Flight Strategies of Migrating Hawks* (Kerlinger 1989), and an extremely useful summary has been provided by del Hoyo *et al.* in *Handbook of the Birds of the World* (1994). Important regional works include those by NG Smith (1980, 1985) for the Central American flyway; Shirihai & Christie (1992) for Israel; Ash (1993) for Indonesia; Brazil (1991), Brazil & Hanawa (1991) and McClure (1998) for eastern Asia; and Marchant & Higgins (1993) for Australasia. *Bird Migration* (Alerstam 1990) also gives a great deal of useful information relating to raptor movements.

Furthermore, the results of intensive studies in various parts of the world have resulted in two major works, both published in 2000. *Raptor Migration in Israel and the Middle East* (Shirihai *et al.*) details the results of counts and observations made in that region since the mid 1960s, and includes analyses of seasonal timing and many other factors. And *Raptor Watch: A global directory of raptor migration sites* (Zalles & Bildstein) represents the most detailed and comprehensive work yet published on all the world's known raptor watchsites (nearly 400 in all), including recorded numbers of migrating birds of prey and timing of migrations.

Whether a species migrates or not depends on several factors, most important of which is food availability. Those inhabiting tropical forest, or restricted to one or a few islands, are sedentary. In fact, many raptors living in the tropics and subtropics are largely sedentary, including, among many others, such diverse species as most of the cathartid vultures of America, the two Afro-Malagasy gymnogenes *Polybunoides*, the Crane-hawk *Cerantospiza caerulea* and the 'white hawks' *Leucopternis* of the Neotropics; or they make relatively short movements in response to seasonal climatic changes. In addition, such species may become rather nomadic when not breeding, a lifestyle followed also by many migratory raptors in their non-breeding areas. By contrast, most raptors in temperate regions, as well as many open-habitat species such as the Grasshopper Buzzard-hawk *Buteo rufipennis* in West Africa, undertake some kind of seasonal movement.

Many species are partial migrants: their northern (or southernmost) populations migrate, while those in more temperate climates do not. Good examples include the Golden Eagle *Aquila chrysaetos* and the Peregrine Falcon *Falco peregrinus* in the Holarctic: the tundra races of the latter move right down into the southern hemisphere, thereby leapfrogging other shorter-range migrants of their species and spending the non-breeding season south of resident populations. Yet even in the north polar regions, some species



Fig. 13. Primary routes followed by migrating raptors. Most important flyways are shown by broad lines, narrower lines indicating secondary routes. Many other pathways not shown on the map are used regularly by variable numbers of raptors.

are capable of surviving winters that are harsh in the extreme: Steller's Fish-eagles *Haliaeetus pelagicus* in northeast Asia move only a short distance south to feed around ice-covered waters on Hokkaido; and most Gyr Falcons *Falco rusticolus* spend the non-breeding period not far south of the Arctic Circle, and some well inside it, though the entire population may migrate at times of extreme food scarcity. This last event is an example of irruptive migration, associated more with such food specialists as the rodent-eating Rough-legged Buzzard *Buteo lagopus* in the north and, in the south, Australia's desert-dwelling Letter-winged Kite *Elanus scriptus*; similar, nomadic movements are made by various insectivores in the tropics.

Of the 313 raptor species treated in this book, over 60% undertake some form of annual seasonal migration, ranging from short local movements, such as post-breeding dispersal, to much longer flights over thousands of kilometres from one hemisphere to the other. In the case of some 20 species, virtually the entire population migrates. Full discussion of these phenomena would fill an entire volume, and in these few pages it is possible to give only the very briefest and most superficial of summaries with just occasional examples of the many remarkable aspects of raptor movements. Fuller details are given in the 'Movements' section of the individual species accounts, and in the publications listed above. In particular, however, one has to marvel at the long-distance migrations of Swainson's Hawks *Buteo swainsoni* from southern Alaska to northern Argentina and back, a round trip of some 30,000 km, and the equally long journeys made by 'Steppe' Buzzards *Buteo buteo vulpinus* between Siberia and southernmost Africa. Just as impressive are the autumn flights made by Eastern Red-footed Falcons *Falco amurensis* and Lesser Kestrels *F. naumanni* from east Asia to Africa, many apparently crossing 3,000 km over the Indian Ocean; the return takes most of them north through East Africa and across the southern parts of the Asian continent.

In very general terms, the various strategies adopted by different migratory raptors are to a large extent dictated by their structure and by what is known as wing-loading, the species' weight divided by its wing-surface area ['Raptor plumages and external structure', pp. 57–68]. Species with high wing-loading, such as most accipiters and hawk eagles, and the typical falcons, are capable of strong flight with rapid bursts of flapping. Narrower-winged raptors, which include most harriers *Circus* and, especially, the *Falco* species and the Osprey *Pandion haliaetus* with their well-developed pectoral musculature, are better adapted for active flight and can more easily cross open areas of sea and desert.

Low wing-loaders, typified by large kites and eagles, buteos and most vultures, are not capable of sustained flapping and are better suited to soaring and gliding: they therefore require updraughts and warm-air thermals to enable them to travel long distances, also using the dynamic winds that arise on the windward side of a mountain or similar edge. This means that the broad-winged species have to follow mountain ranges, coasts and similar leading lines where they find thermals in which to soar to high levels before gliding to the next thermal, where the process is repeated, this continuing all the way along the route to the final destination.

Several departures from this broad picture demonstrate the way in which raptors adapt to circumstances. For example, Western Honey-buzzards *Pernis ptilorhynchus*, with relatively low wing-loading, often use flapping flight for part of their migratory flight; conversely, other species, such as the Levant Sparrowhawk *Accipiter brevipes*, though capable of sustained beats, make extensive use of soaring-and-gliding flight on their travels. In fact, all raptors will take advantage of thermals when they encounter them.

Many raptors travel for at least some of their journey on a fairly broad front, and at great altitude, this being characteristic of, for instance, Eastern Red-footed Falcons and Lesser Kestrels migrating from eastern Asia to Africa. Their passage is, therefore, invisible to ground-based observers. Yet at least some of these, as well as the majority of the soaring-and-gliding species, become concentrated at narrow land bridges and at mountain passes, and, since raptors migrate almost solely by day (though radar studies in the 1990s provide good evidence that some, such as harriers, Levant Sparrowhawk and some falcons, at times migrate also by night), and normally in good weather conditions for viewing, it has been possible to collect a great deal of data on their migrations. Although identifying raptors in flight, at long range, poses many problems ['Identifying raptors', pp. 40–43], great advances made since the 1980s have enabled reasonably accurate reports to be amassed in many parts of the world.

Because most raptors try to avoid having to make sea-crossings of more than c25–30 km – though there are several notable exceptions (see above) – huge concentrations form at bottlenecks which afford the shortest possible crossing from one landmass to another. Several of these sites are very well known: in America, the isthmus of Panama and the Antilles chain of islands; in Europe, Falsterbo at the southern tip of Sweden, Gibraltar, and the Strait of Messina separating the foot of Italy from Sicily (from where raptors move between Europe and Cape Bon in north Tunisia); in the Middle East, the Bosphorus in Turkey, Eilat at the north end of the Red Sea, and several other sites; and, in Asia, the Isthmus of Kra and the Strait of Malacca in the Malay Peninsula, the Sundas, the Korean Strait, and the island chain of the Ryukyus (Nansei-shoto).

Migration seasons vary depending on species, but very generally, and taking extremes into account, autumn passage of northern migrants begins from late July–August, though many raptors do not depart until September; passage peaks on route frequently occur in September–October, with stragglers occurring

through November. Non-breeding quarters may be reached at any time from as early as September to, in the case of long-distance migrants, as late as January. Return migration, generally less leisurely than that in autumn, can begin from January in the far south, increasing in intensity through February–March. Breeding grounds are reoccupied from about April–May, but raptors nesting in the world's northernmost regions are often not back until May or even early June.

The timing of passages is approximately the same each year for any given species, though peak periods can vary by up to several weeks depending on weather conditions. Different age-classes may migrate at different times, and along different routes, but space here does not allow discussion of this interesting phenomenon (for further details, see e.g. Shirihai & Christie 1992, Shirihai *et al.* 2000).

## MAIN ROUTES AND WATCHPOINTS

A number of migration routes have been used by raptors for probably thousands of years, and these traditional flyways and corridors offer a reliable means of studying the movements of diurnal birds of prey. The world's main raptor routes are shown in fig. 13. As mentioned in the opening paragraph, all known watchpoints through which raptors pass regularly on migration – 388 in total – are listed in full, with comprehensive data on species, numbers and timing, in *Raptor Watch: A global directory of raptor migration sites*. Here, we present a very brief summary of the most important routes and sites.

### America

In the New World, geography dictates that raptors moving between North and South America have but a single optimum route: the narrow land bridge connecting the two continents. The principal routes in North America follow the north-south orientation of the mountain ranges, and four major migration corridors can be identified. These are, from west to east: the Pacific flyway, including the coastal mountains and islands; the Western Mountains flyway, including the Rockies; the Prairie flyway, used by raptors breeding in the western tundra and boreal forest; and the Eastern flyway, through Labrador and the east Canadian coast, around the Great Lakes and along the Appalachians.

Many watchpoints are situated in the border area between Canada and the USA, notably in the lower ranges of the Rockies in the west, around the Great Lakes, and in New York State and the Appalachians in the east. In Pennsylvania, one of the most familiar names to raptor enthusiasts is Hawk Mountain Sanctuary in the central Appalachians, visited by many thousands of birdwatchers over many decades since its importance was first pointed out in 1934: 16 species occur there regularly, with an average annual total of 18,000 raptors counted.

Autumn migration begins on a broad front in the north, becoming more concentrated towards the Canadian border. In the west, a proportion of migrants continues southward along the coastal mountains, large numbers then moving through California, though the majority appear to take a more inland route along the Rockies; east of there passage is more dispersed, with some local concentrations along rivers and forest edges. Farther east, however, the Great Lakes represent a considerable obstacle, and south-bound raptors are forced to fly around the western shores of these huge waters before moving down the Appalachians: at one station, Southeastern Michigan Raptor Research on the west shore of Lake Erie, an annual autumn average of some 110,000 raptors is recorded, and considerably more in some years.

Although some birds pass through Florida and the Caribbean islands before either turning west towards Mexico's Yucatán Peninsula or continuing through the Antilles to northern South America, the main routes southward converge in Texas along the Rio Grande valley and the Gulf coast: annual counts at Hazel Bazemore Park in south Texas average some 230,000 birds. There, hundreds of thousands of raptors, including virtually the entire world populations of Broad-winged *Buteo platypterus* and Swainson's Hawks, enter northeast Mexico before pressing on south to the narrow isthmus of Panama.

	AUTUMN		SPRING	
	Peak period	Av. total	Peak period	Av. total
Turkey Vulture <i>Cathartes aura</i>	mid Oct	844,000	late Mar	163,000
Broad-winged Hawk <i>Buteo platypterus</i>	late Sep/early Oct	912,000	early Apr	317,000
Swainson's Hawk <i>Buteo swainsoni</i>	early Oct	365,000	early Apr	107,000
Mississippi Kite <i>Ictinia mississippiensis</i>	early Sep	29,500	late Apr	11,110
Sharp-shinned Hawk <i>Accipiter striatus</i>	early/mid Oct	2,430	early Apr	1,840
American Kestrel <i>Falco sparverius</i>	mid/late Oct	2,780	mid Apr	2,100

Table 1. Most numerous of 19 raptor species passing through coastal plain of Veracruz, based on 1991–94 data.

By far the most important site, however, is in eastern Mexico, where the coastal plain of Veracruz provides excellent opportunities for studying the biggest passage of raptors to be found anywhere in the world: an average of 2.1 million individuals of 19 species in autumn and 610,000 of 15 species in spring (table 1). In autumn 1994, 3.3 million raptors passed through during October alone, including over 1.2 million Turkey Vultures *Cathartes aura* (334,000 on 11th October), nearly 1.5 million Broad-winged Hawks (368,000 on 7th), 448,000 Swainson's Hawks (144,000 on 11th), and 10,000 American Kestrels *Falco sparverius* (almost half of these on 10th). Even more remarkably, up to 4.5 million raptors were counted in autumn 1998 and 1999. Despite these staggeringly large passages through Veracruz, the routes followed farther south and through South America are very poorly known. A few migrants fly variable distances down the western side of the Andes, but the majority appear to spread eastward towards Venezuela, as do most Turkey Vultures, or fly along the eastern slopes to the continent's interior. Broad-winged and Swainson's Hawks, for example, move on to northeast Peru and western Brazil, with many Swainson's continuing to the northeast Argentine pampas.

The northward return is very roughly along the same routes, although the detour around the Great Lakes is then made along their eastern shores.

In South America, several open-country raptors that breed in the southernmost Neotropics migrate north in July in response to changes in the weather. A typical example is the Red-backed Hawk *Buteo polyosoma*.

### Europe, Middle East and Asia

Numerous raptor sites are known in Europe, where ornithology has a long history and the study of migration has enjoyed a huge popularity among birdwatchers. Between Falsterbo in the north and the western and eastern ends of the Mediterranean Sea in the south, there are some 21 sites where 10,000+ birds of prey are counted on migration more or less annually. In the Mediterranean, other routes run down through Italy and the Balkan peninsula, thence across to the north African coast. Indeed, it is notable that Italy's Strait of Messina is the only place in Europe where Eastern Red-footed Falcon has been recorded (five spring records between 1995 and 2000).

Migration across Europe is largely on a broad front, with – as elsewhere – concentrations along such leading lines as river valleys and mountain ranges, but seven main migration corridors exist. In autumn, 20,000–40,000 raptors, mostly Northern Sparrowhawks *Accipiter nisus*, Common Buzzards *Buteo b. buteo* and Western Honey-buzzards, leave Scandinavia at Falsterbo before making the short crossing of the southern North Sea to the main European landmass (table 2). Larger numbers collect in the south for the shortest crossing of the Mediterranean – in the west at the Straits of Gibraltar (table 3); and in the east, at both ends of the Black Sea (especially the Bosphorus and the northeast Pontics, with 75,000 and 200,000+ raptors respectively). These latter bottlenecks channel populations from north and east Europe that mostly travel on through Turkey and the Levant.

Every year, several million raptors, of 40 or so species, pass through the Middle East between the Palearctic and Africa. Various routes that skirt the Black and Caspian Seas converge before either turning southward across the Arabian Peninsula, entering Africa at the southern end of the Red Sea at the Babel-

	Average	Max.	Day max.
Western Honey-buzzard <i>Pernis apivorus</i>	5,200	22,100	10,000
Northern Sparrowhawk <i>Accipiter nisus</i>	14,650	19,900	1,890
Common Buzzard <i>Buteo buteo</i>	10,800	37,200	14,800

Table 2. Most numerous raptors at Falsterbo in autumn.

	AUTUMN		SPRING	
	Av. total	Max. total	Av. total	Max. total
Western Honey-buzzard <i>Pernis apivorus</i>	86,700	116,000	4,480	8,210
Black Kite <i>Milvus migrans</i>	39,000	63,000	9,950	
Short-toed Snake-eagle <i>Circus gallicus</i>	5,200	8,780	760	940
Booted Eagle <i>Hieranetus pennatus</i>	6,830	14,490	288	465

Table 3. Most numerous raptors at Gibraltar.

Mandeb strait (240,000 raptors recorded), or moving on through Israel to reach Africa via Suez or Sinai. The spring return is along similar routes but, although significant numbers of Eastern Red-footed Falcons and Lesser Kestrels cross the southern parts of Arabia, fewer other migrants do. Instead, a massive passage moves north on the west side of the Red Sea and then over southern Israel, where Eilat, at the top of the Gulf of Aqaba, records up to 1.2 million raptors every spring, making it the most important Old World watchpoint; it is also, incidentally, the site where migrating raptors have been studied more intensively than they have anywhere else in the world.

Raptor passage through the Middle East is dominated by Western Honey-buzzards, Black Kites *Milvus migrans*, Levant Sparrowhawks, 'Steppe' Buzzards, and Steppe *Aquila nipalensis* and Lesser Spotted Eagles *A. pomarina* (table 4). In addition, a notable 4,000 Western Red-footed Falcons *Falco vespertinus* have been counted in spring in northern Israel.

	N & C ISRAEL:		EILAT:		
	AUTUMN		SPRING		
	Av. total	Max.	Av. total	Max.	Day max.
Western Honey-buzzard <i>Pernis apivorus</i>	321,750	457,400	389,260	851,600	176,420
Black Kite <i>Milvus migrans</i>	1,215	2,695	26,110	36,690	20,450
Levant Sparrowhawk <i>Accipiter brevipes</i>	40,250	60,390	20,450	49,830	25,520
'Steppe' Buzzard <i>Buteo buteo vulpinus</i>	1,160	4,154	348,650	465,820	130,000
Lesser Spotted Eagle <i>Aquila pomarina</i>	83,584	141,860	55	211	—
Steppe Eagle <i>Aquila nipalensis</i>	231	—	28,480	75,000	4,292

Table 4. Most numerous raptors passing through Israel, 1978-98.

Farther east, migrant raptors moving south out of northern Asia concentrate along main river valleys and mountain slopes and passes, and along the shores of large lakes such as Baikal. Some of them meet up with the more westerly populations migrating around the Caspian Sea, but most move into southern parts of the continent, especially India. With Asia having few ornithologists, and access to sites being in many cases far from easy, coverage of much of the continent has been at the very best only partial. Reliable information is limited, and relates chiefly to some migration corridors in eastern and southern Asia.

Those raptors breeding in the region from northeast Siberia to Japan follow the East Asian flyway, which splits into three main arms: the eastern inland route follows eastern China down into the northwest parts of southeast Asia and on through the Malay Peninsula, then across the Malacca Strait to Sumatra, where it turns eastward through the Sundas; another arm proceeds from northeast Siberia along the Pacific coast to reach southeast Asia; and a third takes raptors down an oceanic route, passing through the Kurils, Sakhalin and the Korean Peninsula into Japan, then down through the Ryukyus (Nansei-shoto) and Taiwan to the Philippines, some birds continuing thence across to the southeast Asian mainland and Indonesia (this last journey includes the longest over-water flights of any raptor route with the exception of that apparently taken by small falcons crossing the Indian Ocean: see above).

On China's east coast, 11,000+ raptors passing Beidaihe in autumn include up to 6000 Pied Harriers *Circus melanoleucos*, while at the south end of the corridor, at the Malacca Strait, 180,000 Eastern Honey-buzzards *Pernis ptilorhynchus* have been seen in autumn, along with Japanese Sparrowhawks *Accipiter gularis* passing at a rate of 1,400 per hour. Continuing eastward, through the Sundas, October watchers in northwest Bali have counted 8,000 Japanese Sparrowhawks, 5,000+ Eastern Honey-buzzards and 1,000 Chinese Sparrowhawks *A. soloensis*.

The vast majority of raptors recorded on the easternmost routes are this last species and Grey-faced Buzzard-hawks *Butastur indicus*. Tens of thousands of each travel through Japan to Taiwan, where up to 70,000 Chinese Sparrowhawks and 10,500 Grey-faced Buzzard-hawks are observed in autumn (and 11,600 of the latter in spring).

## Africa

Although some raptors, including many harriers and small falcons, as well as Ospreys, reach Africa across a broad front and, being strong active fliers, often continue south across the Sahara, most Palearctic migrants, as outlined above, enter at the northeast and northwest extremes on each side of that formidable desert barrier. In the west, these move variable distances southward, rather randomly and slowly. The biggest numbers, in the northeast, more or less follow the Rift Valley, in some cases all the way into

southern Africa. In spring, northbound raptors moving along the valley sometimes collect in huge flocks of 100,000+ near and around Lake Victoria.

In the south, certain species migrate north out of southern Africa on a fairly regular basis. The Black Harrier *Circus maurus* of the fynbos scrub and the mountain-dwelling Jackal Buzzard *Buteo rufofuscus* are two such examples.

Most migration within the Afrotropics consists of seasonal movement of variable distances triggered by the onset and subsequent cessation of the rains. Much of this is rather poorly understood, and conflicting statements have often been published. In broad terms, raptors adapt to ecological exigencies by moving north or south within the tropics, to areas where their food is, or is about to become, temporarily abundant; in West Africa, for instance, this involves a shift to the Sahel in the wet season (July–September) and a southward return to the humid savannahs in the dry season (December–February).

### **Australasia**

While many raptors in Australia are either more or less resident or nomadic, a few are regular migrants. Many Australian Hobbies *Falco longipennis* move north after breeding and cross the Torres Strait to New Guinea and the Sundas, before returning a few months later; it is unclear how many other species make this journey. In the south, raptor movements are most pronounced in the east: the Tasmanian population of Australasian Marsh Harrier *Circus approximans* migrates to the mainland, as do juvenile Brown Falcons *Falco berigora*, though the adults of that species are apparently residents on the island.

## **CONSERVATION ASPECTS**

Apart from the relative importance of the various passage corridors to individual raptor species, migration studies have uncovered several important facts of relevance to conservation. By counting numbers of raptors each year, it has been possible not only to revise previous estimates of species' total populations but also to monitor, to some extent, population trends.

Good examples are provided by migrant numbers recorded in the Middle East for two species in particular: Lesser Spotted Eagle was thought in the 1970s to number no more than 1,000 pairs in its entire Palearctic breeding range, but autumn counts of 140,000+ birds at Eilat in 1983 and 32,000 at the Bosphorus five years later radically altered this view; at the same time, the total world population of Levant Sparrowhawk, virtually unknown, was guessed at below 5,000 pairs, yet nearly 50,000 individuals were counted on spring migration at Eilat in 1987, and in 1994 over 44,500 there and 60,000+ in autumn in northern Israel.

While the sparrowhawk's numbers appear to be reasonably stable, the eagle's have decreased considerably, possibly reflecting a reduction on the breeding grounds. This has been shown to be so with the Steppe Eagle *A. nipalensis*: a steady drop since the mid 1980s in migrant totals has been accompanied by an observed decline in breeding numbers in the western parts of that species' range.

In this connection, it should be mentioned that various risks accompany migration. Aside from the possibility that weather conditions will suddenly become unfavourable at any point along the route, there are the obvious physical demands imposed on a bird undertaking long-distance journeys. An interesting adaptation is 'fasting migration', in which the bird takes on sufficient fuel for the journey in the form of fat deposits so that it will not need to feed during the flight. This strategy is followed by some of the buteos and the Western Honey-buzzard, which do not feed during their lengthy journeys, even when food is easily available to them. By contrast, the insectivorous falcons, such as the two red-footeds, hobbies and several kestrel species, being essentially aerial feeders, can take advantage of any insects they encounter along the way.

More serious are various dangers from the activities of humans. It has been a regular pastime in some parts of the world to shoot migrating raptors every year as they pass along traditional routes, the hunters treating this as 'sport' or using the long-discredited excuse that such birds are 'vermin'. Many tens of thousands of raptors still fall victim to the guns in such places as Malta, the Strait of Messina and other parts of the Mediterranean in Europe, and in parts of Central and South America, while the same problems face birds of prey in China and Taiwan. Migrating raptors have even been used for target practice by bored soldiers during times of human armed conflict, as for instance in parts of the Middle East. It is difficult to believe that the slaughter of raptors in such massive numbers cannot ultimately have an adverse effect on breeding populations, the more so since it is the juveniles that make up a large proportion of the passages and normally migrate longer distances than the adults.

Since falconry remains a popular pastime in some parts of the Old World, many raptors, especially large falcons, are caught during migration to be used for this purpose. Trapping is particularly prevalent in the Middle East, but occurs also in parts of China and Russia and possibly elsewhere. Saker Falcons *Falco cherrug*, whose populations are certainly already small, are frequently a prized acquisition for falconers.

# RAPTOR MOULT PATTERNS AND AGE CRITERIA

by Carl Edelstam

A knowledge of moult is central to any assessment of the age of many medium-sized and large raptors. It may also help in determining the sex and, in certain cases when individual birds are in odd-looking intermediate plumages (see 'Body moult' below), sometimes even the species.

## MOULTING PERIOD

Moult costs energy and impairs flight. It therefore takes place at times in the annual cycle when the pressures from nesting, feeding, climatic conditions or migration are not too heavy. It starts usually at the end of the breeding season and, in populations of temperate regions, either is completed before the onset of winter or is suspended during migration and resumed on arrival in the winter quarters.

A few long-distance migrants, such as the Osprey *Pandion haliaetus* and Western Honey-buzzard *Pernis ptilorvus*, remain for their first 18 months in tropical non-breeding quarters, where they go through the moult into their second plumages. Sedentary tropical raptors either moult slowly throughout the year, except when breeding, or may synchronise the moult with the wet or dry seasons.

Among raptor species where the male supplies all the food for the family until the young can be left unattended in the nest, the female may start quill moult during incubation; the male, on the other hand, does not begin until his mate can play her part in hunting. This is not a firm rule, but it may help to distinguish the sexes during the breeding season when one of the two is in quill moult.

## BODY MOULT

Body moult often starts before quill moult and, among larger raptors, is mostly completed before the last new quill has grown. In crude terms, it advances like a wave from front to rear, though certain feather groups may precede the wave. Thus, juvenile accipiters, for instance, often replace some tibial feathers first, before the body moult is properly underway. Individual small falcons may show these early signs of post-juvenile moult during their first autumn, foretelling an early onset of moult in the winter quarters.

In mid-moult between two markedly different plumages, certain raptors may, for a brief period, look rather odd in comparison with their appearance in standard illustrations, including those in this book. In such cases, a knowledge of the timing and progression of body moult will help the observer to identify the species. Some of the hawk eagles of the genus *Spizaetus* are cases in point.

An occasional contour-feather left unmoulted can provide a guide to age. A Northern Goshawk *Accipiter gentilis* with a second-year underwing-covert in the adult plumage can safely be identified as a third-year bird. Conversely, one with an old and worn adult covert in otherwise fresh plumage is in at least its fourth year.

Although, in principle, the body plumage is renewed annually, the number of contour-feathers that escape moult is greater on larger raptors than on small or mid-sized species. These faded retained feathers are not usually visible at any real distance. In the case of, for example, Golden Eagles *Aquila chrysaetos*, however, they stand out from freshly moulted feathers as mottling, especially on the upperwings; they help to distinguish second-winter and third-winter birds from juveniles when other features may, because of the finely stepped plumage development of this species, still present a fairly juvenile appearance.

The number of separate plumages that precede the definitive adult depends in part on the size of the species and in part on its systematic affinities. Small accipiters and falcons moult directly from juvenile to adult plumage. The relatively large Northern Goshawk assumes an intermediate, or 'subadult', plumage for its second year, whereas the equally large Gyr Falcon *Falco rusticolus* does not. Indeed, the largest caracaras (Polyboridae) and, possibly, the forest-falcons *Micrastur* may be the only Falconiformes to have an intermediate plumage.

The second plumages of the snake-eagles *Circaetus* and serpent-eagles *Spilornis* are, as a rule, only slightly different from the definitive adult plumages. But most fish-eagles *Haliaeetus*, harpy eagles, and true *Aquila* or booted eagles *Hieraaetus*, whether large or relatively small, have a sequence of several intermediate plumages. These may represent a gradually stepped change through many plumages from juvenile to adult, as illustrated by the Golden Eagle; or two juvenile-like plumages followed by three or more that gradually approach the adult, as demonstrated by the Imperial Eagle *Aquila heliaca*, or two similar but quite characteristic intermediate plumages followed by one or two closely approaching the adult, as with the White-tailed Fish-eagle *Haliaeetus albicilla*.

Exceptions include the Neotropical Black-and-white Eagle *Spizastur melanoleucus*, three of the four smaller hawk eagles of the genus *Hieraaetus*, which not only lack an intermediate plumage but sometimes cannot, as adults, be distinguished from juveniles; and the Philippine Eagle *Pithecophaga jefferyi*, one of the biggest

of all eagles, yet with the adult almost identical to the juvenile. Insular raptors in general do tend to have fewer intermediate plumages than their mainland relatives, or to produce an adult plumage that is less distinct from that of the juvenile [*Raptor plumages and external structure*, pp. 57–68].

## QUILL MOULT

When plumage details cannot be clearly seen, or do not provide conclusive evidence for ageing, quill moult may offer valuable information: see fig. 14, which illustrates the use of the terms 'wave', 'front' and 'focus' in connection with wing moult.

All diurnal raptors have 10 functional primaries on each wing. All also have 12 tail-feathers (for moult purposes, counted as 6 on each side of the tail), except for Steller's Fish-eagle *Haliaeetus pelagicus* and some Old World vultures, which have 14 (7+7), as does a minority of Forster's Caracaras *Phalacrocorax australis*. But the number of secondaries varies considerably, and it is useful to understand this when checking for moult gaps.

Including the 2–4 small innermost secondaries, nearly all species of the four largest raptor groups have 13–15 secondaries on each wing: the kites, including the bazas *Aviceda* and honey-buzzards *Pernis/Henicopernis* (but not the Bat-hawk *Macheiramphus alcinus*, if indeed it is a kite: see below); the accipiters; the buteonines (except that the exceptionally large Black-chested Eagle-buzzard *Cerantodactylus melanoleucus* and the solitary-eagles *Harpyhaliaetus* usually have 16 – as, incidentally, do the chanting-goshawks *Melierax*, which are often treated as accipitrines but see p.70); and all the Falconiformes. On the other hand, the Indian Black Eagle *Icthyophaga malayensis* has 14–16 secondaries; the two Afro-Malagasy rainforest serpent-eagles *Dryotriorchis* and *Eutriorchis*, the hawk eagles *Hieraaetus* and *Spizartus* and the Palmnut Vulture *Gypohierax angolensis* all have 15–17; the Bat-hawk 16–18; and the larger eagles and fish-eagles 16–21, the number varying slightly among species. Of the other serpent-eagles and snake-eagles, the Asiatic *Spilornis* possess 15–17 secondaries and the mainly Afrotropical *Circus* 17–19, but the almost delta-winged Bateleur *Terathopius caudatus* is endowed with a remarkable 23–25. The very large but rather sedentary Secretarybird *Sagittarius serpentarius* has 18–20 secondaries, and the relatively small but strongly migratory Osprey has 19–21.

While the smaller New World cathartid vultures *Coragyps* and *Cathartes* have only 16–18 secondaries, the similar-spanned but unrelated Hooded Vulture *Necrosyrtes monachus* of Africa and the wider-ranging Egyptian Vulture *Neophron percnopterus* each has 19–21. Among the bigger vultures of both groups, the King Vulture *Sarcoramphus papa* of the Neotropics and the much wider-spanned Lammergeier *Cypaetus barbatus* of Africa and Eurasia are furnished with 20–22 secondaries, and the other large Old World vultures all with 23–25. Of the two widest-spanned raptors of all, the California Condor *Gymnogyps californianus* has only 21–23 compared with the 26–30 of the Andean Condor *Vultur gryphus*.

As a rule, the primary moult series, counting the primaries from the innermost outwards, starts with the fourth primary (p4) in the Falconiformes (fig. 15a), but with p1 in all other diurnal raptors (fig. 15b), and concludes with p10. The moult of all secondaries and rectrices is also normally accomplished within the same period, although occasionally an inner secondary may be shed first, and a middle secondary last (one of s4 or s7–9, counting inwards). Among the upper greater coverts, those of the primaries closely follow their quills, but the secondary coverts and tail-coverts are replaced in a less predictable manner.

The time required to grow a new quill is 2–3 weeks for the smallest accipiters and probably 2–3 months for an Andean Condor under natural conditions. To avoid large moult gaps which might impede flight, the moulting process is divided into smaller units on each wing, and moult waves proceed simultaneously through all units from predetermined foci until they reach a neighbouring moult focus, an opposing moult wave, or either end of the wing.

The time required to grow a new quill is 2–3 weeks for the smallest accipiters and probably 2–3 months for an Andean Condor under natural conditions. To avoid large moult gaps which might impede flight, the moulting process is divided into smaller units on each wing, and moult waves proceed simultaneously through all units from predetermined foci until they reach a neighbouring moult focus, an opposing moult wave, or either end of the wing.

Although similar in principle, this process differs considerably in detail between the Falconiformes and all other raptors. For one thing, all falcons and caracaras have two moult units in the hand and three in the arm, whereas the rest have one and four. Moult-wave direction also differs for some of the units (cf. figs 15a and 15b).



Fig. 14. Moult waves (arrows), fronts (solid lines) and foci (circles) in the wing of an Osprey *Pandion haliaetus* aged 22 months. Note two primary moult waves (representing the second and third generations of primaries) and a worn and bleached outermost juvenile (first-generation) primary. (After Edelman 1964)

In this manner, all the kites and their allies (except, again, the Bat-hawk), and the harriers *Circus*, accipiters and Falconiformes are able to replace their quills annually. Some of the larger species, however, such as Northern Goshawk and Northern Marsh Harrier *Circus aeruginosus*, may retain an old s4 or s8 (or sometimes several mid-arm quills) until the next year's moult.

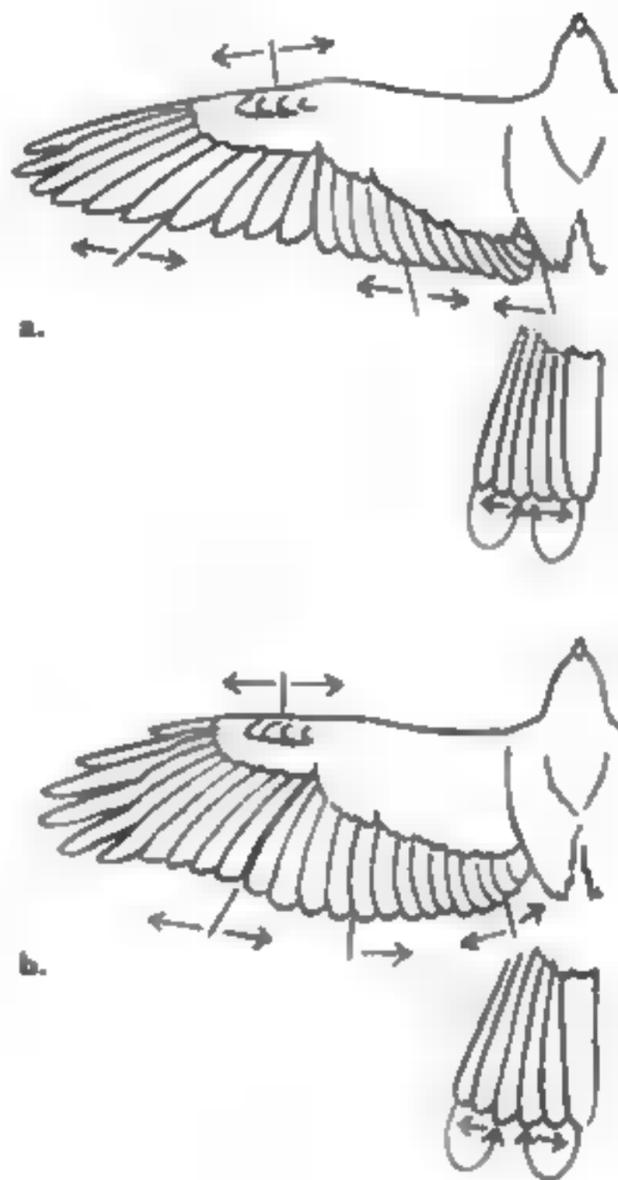


Fig. 15. Left dorsal views of (a) a falcon *Falco* and (b) a generalised accipitrid hawk, with origins and directions of moult waves shown by arrows. Moult waves on the wing proceed linearly in the units indicated; and in the tail on an alternating scheme, with 1-3-2 and 6-4-5 as the preferred sequences. A few long-winged raptors, notably some Old and New World vultures, may have an extra moult focus in the mid-arm region. (After Edelstam 1984)

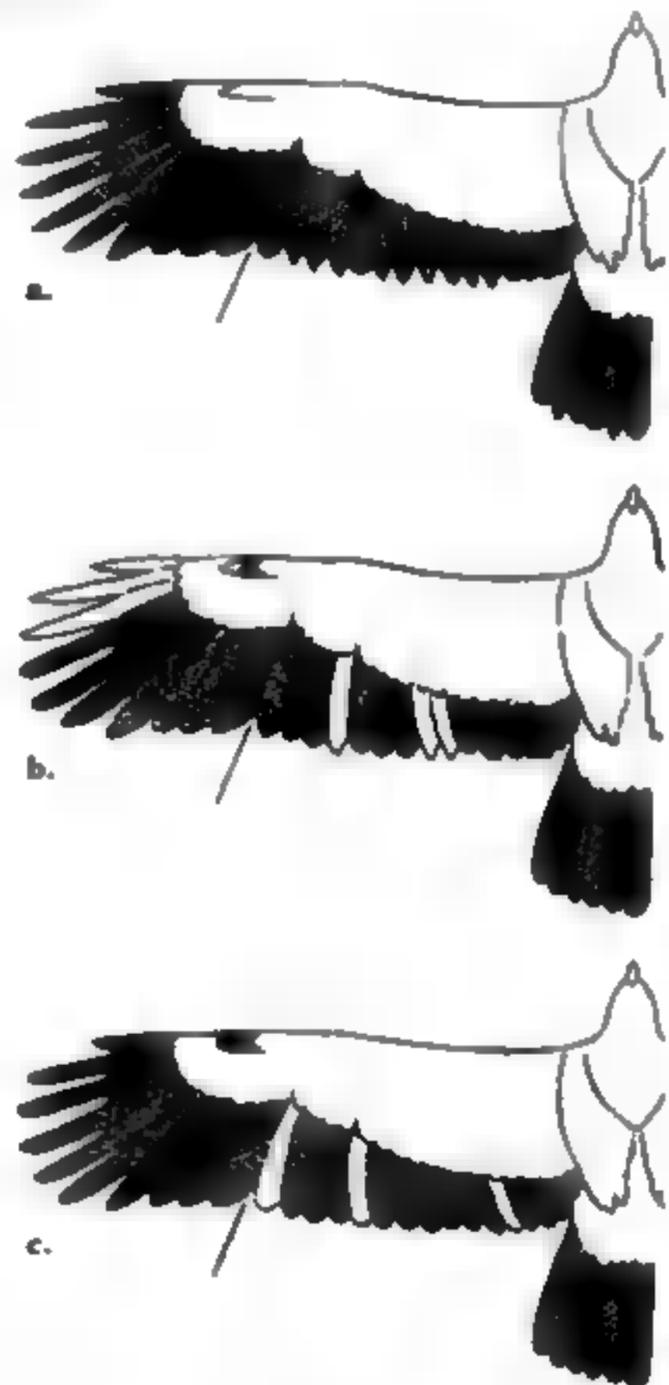


Fig. 16. Left dorsal views of a large eagle in its (a) second, (b) third and (c) fourth years. Fresh quills are shown in black, one-year-old quills shaded, and older quills in white; pointer marks boundary between primaries and secondaries. In practice, a long moult season results in gradual differences in wear and depth of colour which are not attempted here. Individual variation is also considerable and must be taken into account. Note the pointed juvenile quills remaining into the second and even third years. (After Edelstam 1984)

Most mid-sized and large raptors extend the moult of each quill generation over more than one year. By the end of the first moult season, with only some of the juvenile quills replaced (fig. 16a), the moult waves are arrested and then move on as the next moult season begins. At that time, new moult waves - representing the third generation of quills - are initiated at some or all foci (fig. 16b). Other waves follow in subsequent years so that more than one moult front may be present within any unit, each advancing at a relatively slow pace (fig. 16c). (For the smallest buteonines, it should be added, the rapid growth of the quills often precludes the appearance of more than one front within each unit, so they hardly qualify for inclusion in this group.)

This is the process, known as 'serial moult', that is characteristic not only of cathartid vultures, Old World vultures, fish-eagles, snake- and serpent-eagles, gymnogenes *Polyboroides*, chanting-goshawks, larger buteos, true eagles, and the Osprey, Bat-hawk, Long-tailed Hawk *Urotriorchis macrourus* and Secretarybird, but also of some other avian orders with species that are either very large or have particularly stringent demands on flight performance. The latter include pelicans *Pelecanus*, cormorants *Phalacrocorax*, storks (Ciconiidae), most large owls (Strigidae) plus the smaller owls of the genus *Argolius*, and even a few terns (Sternidae).

Since moult waves do not always run entirely in parallel on the right and left wings, and since minor lapses in the sequence occur within units, the picture may become somewhat blurred as a bird ages. This applies particularly to all vultures, which seem to be less dependent on flight symmetry than are the active hunters. (Irregularities are common also among the carrion-eating caracaras, although those moult all quills annually.) As a result, while most remiges and rectrices are renewed according to a crudely annual scheme on the smaller serial moulters, and approximately biennially on many of the large ones, individual wing-quills may serve for 3–4 years on a big raptor. Even these large species, however, often replace some rectrices and inner secondaries after only one year.

## ASSESSING AGE

Until a raptor reaches adult plumage, quill-moult irregularities are usually insignificant. With a knowledge of the pattern and pace of moult, and of the way in which quills become bleached and worn on the wing or in the tail, one can deduce the age of a large raptor in intermediate plumage by examining its remiges and, so long as a juvenile p10, s4 or s7–9 is still present, by counting moult fronts. Later, an approximation of age should be possible up to the time when full adult plumage is assumed. With the bird in the hand or in a good photograph, this can be done even when there is no sign of active moult.

Additional help in distinguishing juvenile quills from later ones is provided by the difference in their length, a typical feature of Lammergeiers, Egyptian Vultures, and the largest *Aquila* and *Haliaeetus* species, and by the difference in their shape, which is more general (though not universal) among raptors: when seen from directly underneath, the pointed juvenile quills make for a saw-toothed appearance to the trailing edges of the wings; by comparison, the adult edges look fairly smooth. As moult sets in, the difference in length becomes even more apparent among the large eagles and fish-eagles, and the Egyptian Vulture and Lammergeier, because their remaining juvenile secondaries stand out from the new quills by 1–4 cm or, in the case of the Lammergeier, by 4–6 cm. This difference in quill length is not shown by the American vultures. Among true raptors, it is almost non-existent in the case of the Imperial and Steppe Eagles *Aquila nipalensis*, and becomes inversed in the smaller *Aquila* species such as the two spotted eagles, on which the juvenile quills are slightly shorter than the adult ones. Among falcons, only the Gyr Falcon and its closest relatives have longer quills as juveniles than as adults.

Differences in colour pattern between quills grown in successive years may also provide significant information. This is especially so for such species as the Golden Eagle, in which, as we have seen, the change takes place gradually over many years.

Nevertheless, the art of ageing large subadult raptors by moult criteria, after the last juvenile quill has been shed, requires a solid background knowledge of many moult protocols so that the moulting speed of each species, and its individual variation, can be correctly assessed. Such detail, which may be obtained only from series of museum skins or from birds trapped for ringing, cannot be given here. (It is hoped to publish the results of this work elsewhere in due course; meanwhile, see also Edelstam 1984.)

Birdwatchers should be aware of the potential value of good photographs, carefully dated, of any large raptors, whether on passage, on the breeding grounds or in winter quarters. A photograph provides a much better basis for assessing age than does any description, however competently reported. Excellent examples of high-quality photographs have been provided by Porter *et al.* (1981), Wheeler & Clark (1995) and Forsman (1999).

A central archive of such photographs, if we had one, could tell us much. It could help us to understand the population structure of some species. It could give us additional information about the timing of the migrations of certain age-classes, a subject already touched on by Shirihai & Christie (1992), Shirihai (1996) and Shirihai *et al.* (2000) with regard to the huge passages of raptors through the Middle East [‘Raptor migration’, pp. 44–49. It could also tell us something about the ages at which various raptors start breeding, because the females at least of many species, from Northern Goshawk to large eagles, may do so in intermediate plumage.

Finally, a word of warning. Captive birds should never be used as a source of reference for moult patterns in the wild. First, the lack of normal social stimulation in captivity may disrupt the moult process. Secondly, regular access to a surplus of food will accelerate it considerably. There is even a suspicion that the food put out by conservationists in Sweden since the mid 1990s to help support wintering White-tailed Fish-eagles in that country may be inducing the birds to assume adult plumage earlier than they did before, when no food supplement was offered.

Readers interested in the more general aspects of moult, such as its seasonal timing and physiology, or a comparison with the moult strategies of other taxa, will find a wealth of information in Ginn & Melville (1983), Palmer (1972), Payne (1972) and Stresemann & Stresemann (1966); a summary was provided by Evans (1985).

# RAPTOR VISION, HEARING AND OLFACTION

by Carl Edelstam

The senses of birds are basically the same as those of most higher animals: vision, hearing, balance, touch and pressure, pain, temperature recognition, smell and taste, plus the enigmatic magnetic sense and an equally enigmatic sensitivity to changes in ambient air pressure. Some of these will attract special interest among birdwatchers, simply because differences in performance of these senses are reflected in differences in the external morphology or behaviour of the birds.

## VISION

The eyesight of raptors has received much attention from physiologists over the last half-century, and has been rather varyingly evaluated. The discussion has often concentrated on the birds' visual acuity, or ability to distinguish fine detail, which is only part of the problem.

In the area of highest receptor density, the retina of the Common Buzzard *Buteo buteo* has about 2.2 times as many cells (cones) per unit length as does that of man (Rochon-Duvigneaud 1943). This is not to say, however, that its visual acuity, corrected for eye size, is twice as good: birds' retinas are rather differently organised from ours and the net result, measured as visual resolution, could be either better or worse than suggested by this figure. Yet data on the innervation of cones in birds' eyes (see Meyer 1977) and, more significantly, behavioural work (see below) have shown 'better' to be the correct answer.

When judging the visual performance of different raptors, we must not forget that resolution of detail is closely related to the absolute size of the eye, provided that optical characteristics and receptor densities are approximately equal (actually, only few measurements are available). The larger eagles and vultures should, therefore, be better equipped than the smaller ones for surveying their foraging territories. An American Kestrel *Falco sparverius*, with eyes distinctly smaller than ours, when trained to respond to increasingly finer grating patterns, would give in only as the repetition rate of the pattern reached 2.6 times the rate visible to a human observer (Fox *et al.* 1976). The ten-times-heavier West African Serpent-eagle *Dryotriorchis spectabilis* was shown by Schlaer (1972), using a different and rather more conservative method, to have approximately the same resolving power as the falcon, at a focal length approaching ours. This could be explained as being due either to the difference in laboratory methods or, as suggested by Fox *et al.*, to an adaptation of visual acuity to the ecological needs of each species, such as the size of prey and the size of the feeding territory that has to be surveyed in order to secure a living.

Be that as it may, a difference of overriding importance in visual capacity between birds and human beings is that, while we have 'foveal vision', with acute eyesight only in the very centre of the retina, almost all diurnal birds have a high proportion of cone cells (for high-definition colour vision) over the whole retina, corresponding to a large part of their field of vision. Because of the more lateral position of their eyes, this field is significantly bigger than ours (except in the case of owls, Strigiformes, which compensate by being able to turn the head nearly 180° to each side). These two factors provide birds with all-round visual awareness far superior to that of humans. Also, many raptors, like other birds that require precision in hunting or feeding – hummingbirds (Trochilidae), kingfishers (Alcedinidae), swallows (Hirundinidae) and so on – have two foveae in each retina and so are able to watch with particular efficiency.

Although diurnal raptors do not match the owls when it comes to binocular vision, their eyes are more forward-directed than those of most other bird groups, especially such ground-feeders as the geese (Anatidae) and the waders (Charadriiformes). Thus, they enjoy a larger field of binocular vision than do birds in general. This is particularly pronounced among the serpent- and snake-eagles *Spilornis/Circus*, apparently because the handling of dangerous prey requires a precise estimate of distance. Image quality is enhanced by the temporal position of the second fovea in all raptors, which seems selectively to serve binocular vision (as does our fovea, though we lack the one for the peripheral field).

Another important point where birds are at an advantage over us is their superior resolution of movement in relation to time. Their so-called flicker-fusion frequency (the time interval required to separate two visual impressions) is about 50% better than ours, or 1/90 to 1/100 of a second rather than 1/60. For many raptors, this may be of importance during rapid manoeuvring in forest or for judging changes in direction and speed of their prey.

Moreover, the colour vision of birds is more complex than that of man and, in a variety of species, covers a wider range at the short-wave end of the spectrum, well into the ultraviolet (Maier 1994). Birds also have two different types of cones (we have just one), four or five colour-sensitive pigments (we have three), and an intricate pattern of coloured oil droplets within the cones to enhance contrast in different parts of the visual field.

The complex asymmetrical architecture of the retina accounts for a strange detail in bird behaviour. A raptor examining a distant object situated straight ahead may turn its head sideways in order to fix the target with the central fovea of one eye, rather than with the peripheral foveae of both (the central one being the better); and, when examining a bird flying overhead, it will often, for the same reason, lay its head on one side.

Birds therefore, in principle, have visual capabilities superior to those of man and very much superior to those of non-primate mammals, which tend to depend more on their sense of smell than on vision. Small birds, however, because of their small eyes, cannot match man's foveal-image acuity. An excellent brief account of avian vision, with further references, was given by Erichsen (1985), and more detailed ones one by Meyer (1977) and Waldvogel (1990).

## HEARING

Birds have a hearing spectrum approximately similar to that of man. Their auditory capabilities have been reported to reach an upper limit at 10–20 kHz – higher in certain owls – and a lower limit at 50–300 Hz (Schwartzkopff 1973); other sources give the upper limit as 10–12 kHz (Dooling 1982). Sensitivity to weak signals in the 1–5 kHz range approaches that of man, but is much poorer than ours above and below this range; again, owls are exceptions, because they depend on broad-band noise for detecting prey. On the other hand, there is evidence for a separate sensitivity peak among domestic pigeons, including Feral Pigeons *Columba livia*, in what we label as the infrasound range (below 10–15 Hz), and this may prove applicable to other species, too. Whether birds suffer a reduction in the hearing spectrum with age, just as man's upper limit falls from about 20 kHz to about 5 kHz, or less, is not known.

For the purpose of exact sound localisation, certain owls have developed sophisticated devices, including skull asymmetries, the performance of which we cannot match, at least in the vertical plane. A potentially more important difference between birds and man is the former's repeatedly better temporal resolution of sound sequences. This ability is thought to permit individual recognition of a partner, of territorial neighbours and, most importantly, between parent and offspring from the moment of hatching.

Few diurnal raptors have been specifically examined for their hearing abilities. The majority presumably conforms to the normal avian pattern, but harriers *Circus* are distinctive in having a facial feather disc reminiscent of that of owls. This appears to be associated with their particular mode of hunting that involves canting slowly at a metre or two above dense ground vegetation, where hearing is as important as vision for detecting prey: the hearing performance of the Northern Harrier *C. hudsonius* of North America approaches, but does not quite match, that of similarly sized owls (Rice 1982).

As was realised long ago by Stresemann (1927–34), the deeper parts of the ear-coverts of many birds are also modified to improve hearing. Thus, for much of their length, the feathers in front of the ear-opening form an open network of slender barbs, devoid of barbules, which is most likely to provide a channel for incoming sound. It is less well known that even such distinguished visual hunters as certain falcons *Falco* have, at the rear edge of the ear-opening, a 'fence' of small, flattened, polished feathers suggestive of an incipient reflector, although not so well developed as on harriers and much less so than on the nocturnal owls. A detailed description of the feathers encircling the ears of raptors was published by Dementiev & Ilichev (1963).

A recently discovered vocal adaptation among small songbirds is of direct relevance to the hearing capacity of raptors. It appears that a whole range of passerines, including thrushes (Turdidae), warblers (Sylviidae) and tits (Paridae), has evolved a kind of common warning call to draw attention to hawks flying over, this call apparently being specifically aimed at fooling the predator by disrupting its hearing abilities. The call is designed in pitch and structure so as to minimise the raptor's chance of locating the calling bird either by phase intensity or by binaural time difference (illustrated in Catchpole 1985).

For two general treatises on hearing in birds, somewhat different in approach and therefore complementary, see Dooling (1982) and Schwartzkopff (1973). A well-illustrated introduction to sound localisation by birds, using the extreme example of the Barn Owl *Tyto alba*, is provided by Konishi (1993).

## OLFACTION

It is now widely agreed that the sense of smell is of greater importance to birds than was generally believed only a few decades ago. Species of many groups have a reasonably well-developed olfactory system (Bang 1971, Bang & Wenzel 1985). A few, such as the petrels and some other Procellariiformes, are critically dependent on smell for close-distance orientation to their nests, and for finding food; and the possibility that odours may play a role in the medium-range navigation of homing pigeons has generated a host of experimental work, but with a partly controversial outcome (review by Waldvogel 1989).

Few studies of this kind are available for raptors. As well as more recent field experiments, occasional observations of an anecdotal nature over nearly 200 years have long suggested that the Turkey Vulture

*Cathartes aura* of the Americas might be assisted by smell in its search for food, and it does have a particularly well-developed olfactory organ. Though some experimental evidence (Smith & Paselk 1988) may tend to support the doubts voiced by John James Audubon as long ago as 1826, the fieldwork devised by Houston (1986, 1988, 1994), including burying dead chickens under dry leaves in forest, has surely established beyond any question that not only this species, but also the Greater *C. melambrotus* and Lesser Yellow-headed Vultures *C. burrovianus*, are able to locate carcasses by smell. All three fly lower when foraging than do the Black Vultures *Coragyps atratus* and King Vultures *Sarcoramphus papa*, which have no functional sense of smell and depend on the three *Cathartes* to lead them to food (Stager 1964, Houston 1984).

Even less is known about the sense of taste of raptors, although its existence in birds is established by anatomical studies (showing the presence of taste buds) and by laboratory work on such species as the Feral Pigeon (Wenzel 1977). Unfortunately, owing to the close association in practice between the senses of smell and taste, it is often difficult, without rigorous experimental control, to know what sense is primarily responsible for the reaction of a bird during feeding or drinking. We have to content ourselves on this point with the experience of falconers, who seem to agree that their birds can be rather choosy about food (e.g. Brüll 1977). Furthermore, the evolution of warning coloration among unpalatable birds (Cott 1946), and the mimicking of unpalatable birds by palatable ones that might be preyed upon by raptors (cf. Edelman 1985), offer no proof that the predators have a sense of taste but only that they possess a functional chemical sense.

# RAPTOR PLUMAGES AND EXTERNAL STRUCTURE

by Carl Edelman

A bird's plumage is a protection for the skin; a shield against, or absorber of, radiation; a warm covering in cold climates, at high altitudes and for nestlings; a waterproof in rain or when swimming; a disguise or advertisement for marital or martial purposes; and, above all, the crucial part of an ingenious flight machine in all but two orders of living birds. It also has a number of specialised functions, such as support for hearing, or as a tactile and protective device in the form of eyelashes, and of facial bristles in, especially, such groups as hawks (Accipitridae) and flycatchers (Muscicapidae) that handle agile prey. Excellent reviews of the structural properties and adaptations of feathers have been given by Rutschke (1976) and Stettenheim (1976).

The feather coat, elastically softened by underlying down, protects the skin from wear and tear during interactions with conspecifics, predators, prey, and vegetation. There are occasional departures from the standard qualities. Among raptors, for example, the Osprey *Pandion haliaetus* has a particularly stiff feather coat on breast and legs – perhaps to absorb the shock when diving for fish, or simply to avoid getting wet – which also means that it lacks the elongate fluffy feathers ('trousers' or, as signals, 'flags') typical of the upper shin (tibiotarsus) of most birds of prey. Old World vultures, which may engage in combat for food, also have a comparatively tough plumage, whereas, for reasons that are not immediately clear, some of the snake-eagles *Circus* and the two gymnogenes *Polyboroides* have quills and body plumage weaker and more buoyant – in dried museum skins, more brittle – than the average. The Bat-hawk *Macheiramphus alcinus*, on the other hand, hunting for crepuscular and acoustically alert prey, has developed a thin velvety coat on its upperwing and tail in fresh plumage; as with owls (Strigiformes), this coat is the result of minute extensions of the feather barbules and serves to muffle sound during attack.

One basic reason for the pigmentation of feathers (and of hair) is to strengthen the semi-transparent keratin with melanins, which are the dark pigments common to all vertebrates. Melanins are among the chemically most stable natural organic compounds. Black feathers are therefore much tougher than white ones; and the primaries are usually among the darkest part of a bird's plumage because they are critical to flight performance and more exposed to wear, and so must be properly reinforced. Even the adult Palmnut Vulture *Cypohierax angolensis*, which advertises itself by its white primaries, has the very tips of the quills blackish; the juvenile, which does not need to establish its identity to the same extent, has a generally dull plumage and entirely dark quills.

Melanins come in two basic varieties: eumelanin, which accounts primarily for the blacks and greys of feathers and hair; and the phaeomelanins, which are responsible for the browns of various shades from bright chestnut (erythromelanin) through buff to the pale yellow of, for example, chicken hatchlings. Very often, the two types intermingle to produce grey-brown or dark brown colours. (For a brief general account of colour in birds, see Vevers 1985.)

By an hereditary change, melanins may invade the plumage to an abnormal degree. While this is an extremely rare event among most birds, a few species, mainly raptors, exhibit such 'melanism' as a normal feature of the population, varying in frequency from less than 1% to over 90%. There may also be a loss of one pigmentary component while others remain active, giving an abnormal chestnut coloration (erythrisms) or a yellowish one (xanthism). The complete absence of pigments leads to albinism: like white portions of an otherwise dark feather, the plumage will wear much more quickly than it would had it been dark.

The bright yellow and red pigments in birds, collectively referred to as lipochromes, are due usually to a carotenoid, often xanthophyll, which does not share the mechanical properties of melanins. Except for a salmon tint in the white feathers of the adult King Vulture *Sarcoramphus papa*, raptors show lipochromes only on their bare parts, such as the feet, cere or iris.

Whether any part of the plumage may also reflect very short-wave, ultraviolet radiation, separately visible to many birds ('Raptor vision, hearing and olfaction, p. 54–56) but merged by humans often with either black or white, has not been explored.

White in feathers, whether present as a pure colour or as a complement to melanins (which makes them look paler), is not produced by a pigment, but is a 'structural colour': in this case, the visible effect of minute air bubbles enclosed in the keratin – just as foam looks white on water. The same holds true for the blues seen in the feathers of many birds, though not of raptors, except that the air bubbles are still smaller and act on a background of melanin, resulting in what is known as Tyndall scattering similar to that which results in the blue sky (which, as we tend to forget, is also produced on a dark background).

Other structural colours are the 'metallic' ones, based on selective reflection of a narrow spectral range at interfaces of keratin/air, melanin/air or keratin/melanin (Dyck 1976). Metallic colours are not

much in evidence among birds of prey, although some species show a bluish or purplish sheen on a jet-black upper side and others a slight bronze sheen on a black-brown ground colour in fresh plumage. In this connection, it is perhaps worth noting that the two races of the Swallow-tailed Kite *Elanoides forficatus* differ in that one has a purplish-violet sheen and the other a green-bronze sheen; and, of the two Neotropical yellow-headed vultures, the Greater *Cathartes melambrotus* is, at least in fresh plumage, distinctly more glossed with green and purple than is the Lesser *C. burrovianus*, which is only variably green-sheened.

Few species of bird are completely or nearly white. They are, however, found in several families and at all latitudes, which demonstrates that a white plumage can, in some circumstances, offer flight service, protection and a decent living to its bearer. The white may in some instances have arisen through albinism, that is by an hereditary loss of pigmentation. Although, in most cases, such a mutant will be at a disadvantage, both socially and in relation to predators and prey, and thus not survive for long, it may in certain conditions prove better adapted than its conspecifics (cf. below under polymorphism). This would, however, probably hold only for incomplete albinos, which retain the pigment of iris, feet and bill and in which the white plumage may sometimes be a dominant rather than a recessive character. The mutant progeny may, in such cases, prove quite viable, except that its plumage will wear more quickly.

Keeping the plumage in good shape requires bathing, oiling and preening. Bathing may cause external pigment, especially iron hydroxide, to accrue in the plumage (review by Berthold 1967). The typical raptor example is the Lammergeier *Cypaetus barbatus*, whose deep buff to orangey tint is the result of minute rust particles becoming enclosed between the feather barbules. This produces what has become part of the species' characteristic appearance in the wild (whether it also helps to reinforce the feathers is not known), but, if held captive, the bird loses this lively colour through moult and looks a sombre black, grey and white. Occasional wild Lammergeiers, too, show little of the rusty coloration, presumably because the areas in which they live are poor in iron; or perhaps these are individuals not prone to bathing. Another special adaptation to protect the plumage from soiling is the so-called powder down and powder feathers. These terms refer to certain down-feathers and contour-feathers which produce a keratinous powder that is thought to encapsulate slime and facilitate its removal. Although production of powder may occur over most of the plumage – as, for example, in pigeons (Columbidae), presumably to neutralise the crop milk, as well as the dirt typical of their nests – it is characteristically found in the crop region of landbirds which handle fish and amphibians with the bill. Among raptors, powder down has been reported from a variety of species whose diverse habits do not seem to tally with the standard explanation of its function: these include the several black-shouldered kites *Elanus*, the Swallow-tailed Kite, the Lammergeier, several harriers *Circus*, and the Harpy Eagle *Harpia harpyja* of Latin America.

## FUNCTION OF COLOUR PATTERNS

Whereas the nature of feather colours is a matter for biochemical and microscopic study, the effect of feather coloration on the appearance of the bird must be interpreted primarily in terms of habits and behaviour.

The plumage of, probably, a majority of juvenile birds and a great many adults is cryptic to an extent that it merges with some standard background and so helps to protect its bearer from being discovered by predators or prey, or both. This need for concealment has to be balanced against the need, when adult, to advertise oneself as a prospective mate and defender of a territory. This may be achieved by a change in behaviour, voice, size of feathers, shape of bare parts, or colour.

Only about 40 of the 313 raptor species recognised in this book are strikingly black and white as adults; but another ten or twelve are bright chestnut and white, often with some black present also. More surprisingly, about one-third of these species have juveniles that are nearly as brightly patterned as their parents. It is a moot question whether the reason why they can afford such extravagance is that they have few natural enemies, for many of them still have to catch prey which should spot them more easily because they are strikingly coloured, provided that the advantage of a concealing disruptive pattern (cf. Cott 1957, 1985) does not explain these cases. (For a discussion of the many interesting implications of 'colourfulness' among birds, see Butcher & Ruhwer 1989).

In the great majority of raptor species, however, both juveniles and adults look relatively dull or, even if the adults are colourful, the young are distinctly duller. In either case, a juvenile can usually be identified as such by having relatively broad, pale (brown, buff or white) edges to many of the feathers of its upperparts, frequently including some of the flight-feathers; but these edges will often gradually wear off before the following plumage is assumed. Differences in the patterning of remiges, rectrices, underparts or head are also commonly associated with age.

Between juvenile and adult stages there is a period when a post-juvenile/subadult may duly impress its juniors, and at the same time derive some protection from attacks by its seniors, by wearing an intermediate plumage (cf. Brüll 1977, Lawton & Lawton 1986). In raptors, such plumages are limited to such mid-sized

or large, long-lived groups and species as fish-eagles, most vultures, gymnogenes, harriers, Northern Goshawk *Accipiter gentilis*, certain buteonines, most eagles, and the largest caracaras (Polyboridae). The intermediate plumage may variously resemble the juvenile (e.g. second-year African Gymnogene *Polyboroides typus*, and second- and third-year Imperial Eagles *Aquila heliaca*); look distinct from both juvenile and adult (e.g. second- and third-year White-tailed Fish-eagles *Haliaeetus albicilla*); more closely resemble the adult (e.g. Northern Goshawk); or develop gradually over several years into the definitive stage (e.g. second- to around ninth-year Golden Eagles *Aquila chrysaetos*, and fourth- to around sixth-year Imperial Eagles).

Why some birds of prey have an adult plumage quite different from that of the juvenile, while others show little difference, is by no means clear. Baumgart (1974) attempted an answer based on social behaviour. He pointed out that the adults of a broad range of solitary, sedentary raptors have barred flanks or breast very different from the streaked underparts of the juveniles, the barring serving, on his hypothesis, to warn any rival disputing claims for a mate and a territory. In contrast, the adults of species which are less territorial (especially Eleonora's Falcon *Falco eleonora*, cf. Walter 1979), or which tend to be social on migration or in winter quarters, are less visibly barred or, sometimes, are even streaked like juveniles. As juvenile plumages are generally believed to suppress aggression, retention of the pattern by the adults may help to reduce conflict between neighbours; and a general lack of pattern (such as might be attained through dilution or, conversely, through melanism) would be still more appeasing. The relationship has been substantiated neither experimentally nor by quantitative data, but this does not invalidate the approach.

The general tendency towards simplification of plumages among island birds, compared with their continental relatives, is noticeable in a number of raptors as a juvenilisation of the adult plumage, or as the elimination of an intermediate stage. Grant (1965), working with passerines, concluded that, in an isolated population where closely related species are often absent, there is less need for externally distinctive specific traits, which have therefore been lost during the reorganisation of the genome that took place in response to other needs in the new island environment. Cases in point among raptors are the Madagascar Gymnogene *Polyboroides radiatus* and Madagascar Fish-eagle *Haliaeetus vociferoides*, compared with their African counterparts *P. typus* and *H. vocifer*, and Sanford's Fish-eagle *H. sanfordi* of the Solomon Islands, compared with the closely related White-bellied Fish-eagle *H. leucogaster* that is widespread from India to Australia. An extreme example of plumage reduction in an insular species is that of the Philippine Eagle *Pithecophaga jefferyi*, whose adult plumage is hardly separable from that of the juvenile, even though this is one of the biggest of all eagles.

Behaviour must, however, be considered in association with ecology. For example, most vultures and several other species that feed extensively on carrion, such as the *Aquila* eagles and large *Haliaeetus* fish-eagles, or on visually handicapped prey, such as the two snail-eating kites *Rostrhamus*, are nearly as dark below as above. The Osprey on the other hand, as one of the few nearly exclusively fishing raptors, looks almost white from below, like many gulls *Larus* or terns *Sterna*; in contrast to the colourful Black-collared Hawk (or 'Fishing Buzzard') *Busarellus nigricollis* of Latin America, which prefers to still-hunt from a perch, the Osprey spots its prey by patrolling openly over the water. Most harriers, accipiters, buteonines, non-*Aquila* eagles and falcons are paler below than above, which may well make them less visible to their prey, although an element of counter-shading (cf. Cott 1957, 1985) could also be involved.

Several of the few raptors with marked plumage differences between the sexes are harriers, the adult males being partly ashy-grey or pied to sort them out from the brown females and juveniles: all but one harrier species breed on the ground, and the females, responsible for incubating the eggs and brooding the young, are therefore mostly streaked brown and buff above like dry grass or reed (Nieboer 1973). It is interesting to note that the sexes are similar in the case of the tree-nesting Spotted Harrier *C. assimilis*, and that they are less distinct in the much more powerful Long-winged Harrier *C. buffoni*, which, like some of the marsh harriers of the *Circus aeruginosus* superspecies, nests in tall, dense reeds.

One overriding influence on the coloration of the plumage is that of climate. As a rule, colours become paler and more buffish in dry, hot climates, darker in moist climates, and paler and more greyish in dry, cold climates (Gloger's rule). To some

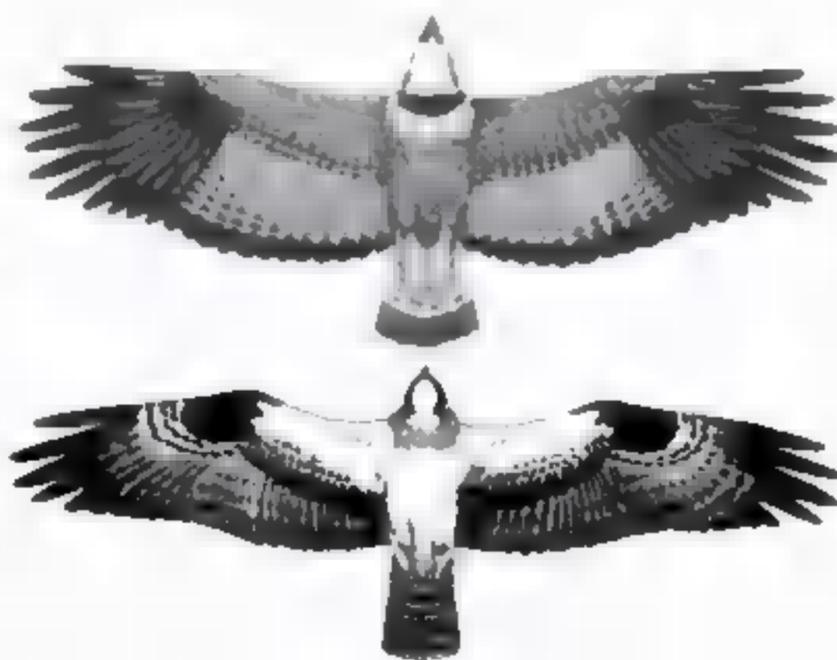


Fig. 17. Difference in appearance from below between (upper) Black-collared Hawk *Busarellus nigricollis* and (lower) much whiter-looking Osprey *Pandion haliaetus*.

extent, this can be accounted for by crypsis. It seems reasonable, for example, to assume that juvenile Northern Goshawks of the Kamchatka race *albidus* are often white because it helps them to approach their prey and avoid mobbing during the hard snowy winter, which is a bottleneck for survival in that part of the world. When adult, these birds become a dilute ashy-grey above and faintly barred grey on white below, presumably to demonstrate their maturity to partners and competitors.

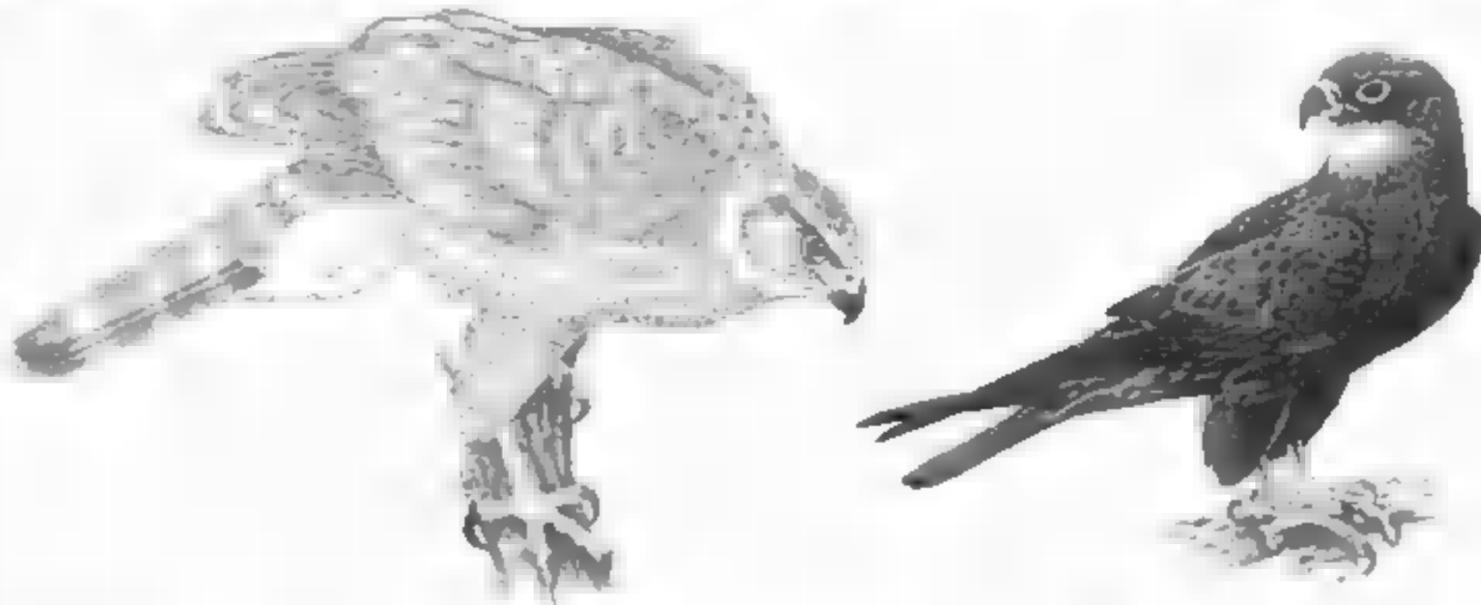


Fig. 18. Northern Goshawk *Accipiter gentilis* of northeast Asian race *albidus* (left) is pale grey, as would be expected in cold, dry climate there, whereas desert-dwelling Sooty Falcon *Falco concolor* (right) of Middle East is surprisingly dark. See text for discussion of plumage coloration.

Why a number of birds depart from this 'ecogeographic rule' is not always clear. The Sooty Falcon *Falco concolor* is dark grey in a desert environment. Some similar cases have been explained as being the development of a cryptic likeness to dark lava terrain or, where that does not fit, to the shadows cast by stones and rocks in the sun; as a signal of presence to conspecifics, or of unpalatability to predators; and as a shield from ultraviolet radiation or against abrasion from sand blown past by the wind (see Burt & Rohwer 1989).

At the other end of the dark-light scale, the Black-and-white Eagle *Spizastur melanoleucus* of Neotropical rainforest is snow-white below, except on the remiges, and largely dark above in both juvenile and adult plumages: is this a case of counter-shading, or does it make the predator less visible because the white blends with patches of light in the canopy above? These are questions which can be answered only by careful consideration of each case, including field studies and a subsequent search for co-variation over a range of species.

## HEAD PLUMAGE AND BARE PARTS

The feather coat of the head is of critical importance to social behaviour, and may be further modified for a number of purposes. Many raptors, particularly eagles in the broad sense but also hawks *Accipiter*, the Bat-hawk and certain honey-buzzards *Pernis*, have an erectile nuchal crest which may consist of anything from a broad ruff (as on the *Spilornis* serpent-eagles) via a twin crest (Harpy Eagle, Crowned Hawk Eagle *Stephanoaetus coronatus*) to a few narrow elongate feathers swinging from the back of the nape, as on some of the southeast Asiatic hawk eagles *Spizaetus* and their honey-buzzard mimics (cf. below) and, especially, the Long-crested Eagle *Lophastur occipitalis* of Africa. The Secretarybird *Sagittarius serpentarius* is unique in this respect, as in many others, and sports a wide loose crest of about 30 narrowly spatulate, dark feathers 60–180 mm long. Certain *Spizaetus* hawk eagles have a crest in only parts of their range. This may indicate, as suggested by Brown & Amadon (1968), that it is of little selective value; or there may be some less obvious – perhaps historical – reason for the crest's local absence.

A light forehead or eyebrows, dark gular or malar stripes, and distinctive colouring of the cheeks or ear-coverts are recurrent and often age-specific features of certain species of most major raptor groups. The colour of the eyes, commonly bright yellow in the adult but sometimes orange, red, white (e.g. King Vulture) or bluish (Philippine Eagle), will add to the overall effect. Eye colour may also, albeit rarely, differ between sexes (e.g. Hen Harrier *Circus cyaneus*), suggesting that, in these instances, it has been accorded a signal function supplementary to that of plumage. Age differences in eye colour are commonplace and, no doubt, of social importance.

On raptors as different as *Aquila* eagles and caracaras, a contrasting nape and neck may serve as a major tool for species recognition. Another trait shown by a number of accipitrids and falconids is a small light patch on the hindneck, produced by a varying number of white or buffy feathers, often narrowly dark-tipped: this may be permanently visible, as on the Northern Sparrowhawk *Accipiter nisus*, or become apparent when the feathers are raised in excitement. Such a patch is more common among continental

than among insular species (Hafner & Hafner 1977), and it is interesting that it has been faithfully copied by juveniles of the several *Cuculus* cuckoos that mimic local accipiters and so gain protection from predators (Edelstam in prep.).

On certain small falcons, the neck-patch is part of a so-called occipital face: a hindneck pattern that models the true face in a crude way, with 'eyes', 'eyebrows' and a hint of a 'bill'. This pattern occurs also among some of the smallest owls, notably members of the genus *Glaucidium*. For this trait various functions have been suggested, though without convincing evidence, such as strengthening the pair-bond (each partner is constantly paying attention to the other), signalling 'unprofitable prey' (the bird looks as if already aware of an impending attack), or keeping mobbing passerines at a distance to the rear. An example is the American Kestrel *Falco sparverius*, on which this dummy face is particularly evident among the juveniles (Clay 1953) and thus does not fit the first explanation, which, to be sure, also does not take account of the strict association of this trait with small body size.

Eyelashes are sensory bristles that warn us when to close our eyelids and also help mechanically to protect the eyes. They are also present, if not very conspicuous, on most birds of prey, but are poorly developed in the Old World vultures and practically absent in the New World Cathartidae; conversely, they are exceptionally long (10–20 mm) and flattened on the Secretarybird. The unique design of the Secretarybird's eyelashes may be related to its feeding habits: in theory, at least, they could protect the eyes from sparks from savannah fires which the birds attend to collect fleeing or wounded prey (Tore Hanson *in litt*), or from the blinding poison of spitting cobras *Naja* that deliberately aim for the eyes of an enemy.

Other bristles are found at the base of the bill on most raptors and are more pronounced on some of them, such as the Madagascar Serpent-eagle *Eutriorchis astur*. Their main function may be to protect the eyes when the bird is feeding, but they are also likely to provide sensory information on wriggling prey which facilitates the handling of it (Brüll 1977).

A unique protective plumage is found in the honey-buzzards, which have lost the loreal bristles of their accipitrid relatives in exchange for a cover of small, flattened, scale-like feathers. These have been thought to protect the birds from the stings of the wasps and bees whose nests they plunder, but such a function has not yet been convincingly demonstrated. The feathers may perhaps also help to ensure that honey or the fat from grubs does not soil the honey-buzzard's face during the excavation of the combs.

How to avoid soiling the head plumage when feeding is a problem common to many raptors. Apparently as an effort in this direction, a partly bare facial skin has evolved in the Grey-headed Kite *Leptodon cayanensis*, the Palmnut Vulture and the gymnogenes. The kite is a predator on wasp nests, and the vulture relishes oil palm *Elaeis guineensis* husk, as do the gymnogenes, which also search for food in tree holes and crevices where unexpected problems, including insect nests, may well await the investigator. (The gymnogenes' skull, uniquely small and narrow for birds of that size, is another adaptation for their unusual manner of feeding.) Other species with bare facial skin, such as the Bateleur *Terathopius caudatus* and the Latin American caracaras, tend to live in part on carrion or, in the case of the three *Chondrohierax* and *Rostrhamus* kites, almost exclusively on snails; the Red-throated Caracara *Daptrius americanus* is, in addition, fond of wasp grubs. Why the Secretarybird should have a bare face seems less evident.

In the carrion-feeding vultures (both Old and New World), the plumage of the head may be nearly absent; or reduced to a coat of short down, as in the Monk Vulture *Argyrops monachus*; or replaced by small areas of short, dark, tight-fitting bristles, as with the California Condor *Gymnogyps californianus* and King Vulture. Thus, vultures need not bother about keeping clear of blood and entrails that would soil a feather cap.

The specific differences in the extent of the bare parts on the neck may reflect differences in the manner of feeding. The only vulturine type that does not show a reduction in head plumage, the Lammergeier, gives way to all other vultures at a carcass, in spite of its impressive size, and so can proceed in a more orderly manner with its meal, which consists mainly of bones left over by the other vultures. In addition, it has evolved a remarkable stiff beard and a moustache, which may help to keep the face clean as the bird extracts marrow from bone.

A head stripped of its plumage does not immediately lend itself to a great range of social signals. This problem has been taken care of by selection, and we find that a bare facial skin may be vividly coloured (e.g. yellow on gymnogenes, changing to red as the birds become excited; orange on the Secretarybird; and red on the Bateleur), and a bald head may be adorned by combs and lappets which in turn may be vividly coloured, as on the King Vulture.

Moreover, a bald head and a naked neck make for poor heating economy in cold surroundings. Therefore, vultures living at high latitudes or in montane regions – notably, the Himalayan Vulture *Gyps himalayensis* and the Andean Condor *Vultur gryphus* – have a thick downy collar into which the neck can retract at rest and in flight. On other vultures, the downy part of the collar is less developed in comparison with the associated ruff of lanceolate feathers. As with the gymnogenes, the bare skin of the neck and head of the Andean Condor changes colour during courtship and at other times of excitement.

## POLYMORPHISM

Apart from differences due to sex, age or geography, the great majority of bird species also show slight variations in size, shape and colour. A few species, however, have two or more classes of markedly different individuals which may occur side by side in relatively stable proportions. Such 'morphs' (formerly known less precisely as 'phases') are more common among the accipitrids and falconids than in any other major group of birds (for a review, see Huxley 1955).

A melanistic morph is the commonest, resulting as a rule from a surplus of eumelanin, and sometimes also of phaeomelanin, on a mixed (normal) background of both kinds of melanin, this giving rise to a dark brown or blackish-brown plumage. In cases where eumelanin but not phaeomelanin is involved, the effect is of a pure black or dark grey, dependent on concentration; with 'red' phaeomelanin only, the result is an intense chestnut (erythrism). On rare occasions, it seems that eumelanin can simply replace phaeomelanin, as in the grey morph of the Long-tailed Hawk *Urotrionchis macrourus*, in which the dark neutral grey of the throat extends to breast and belly, which are normally chestnut.

Melanistic morphs occur as a more than occasional feature in over 30 species of honey-buzzards and other kites, fish-eagles, harriers, accipiters, buteos, true eagles and falcons; and erythristic morphs in another ten. In addition, as suggested by Cooke (1985), some species which are now characteristically dark may at some stage have been polymorphic, until the dark morph got the edge on its conspecifics and eventually became 100% dominant. Cases in point might be the Black Honey-buzzard *Henicopernis infuscatus*, Black Harrier *Circus maurus*, White-rumped Hawk *Buteo leucorrhous*, Long-crested Eagle and Black Falcon *Falco subniger*. Conversely, the dark morph of Steller's Fish-eagle *Haliaeetus pelagicus* may have become extinct over the last two decades as a result of the merciless persecution of large birds in North Korea, its former centre of distribution.

Closely related species may look deceptively similar in melanistic plumage. As melanin invades the plumage, however, it may in some cases leave white those parts which in the pale morph are entirely devoid of pigment, and this may help to identify a bird. Moreover, parts of the plumage which are pure chestnut may remain unaffected by an increase in eumelanin. For instance, the Rough-legged Buzzard *Buteo lagopus* in North America and, in Eurasia, the Long-legged Buzzard *B. rufinus* and Upland Buzzard *B. hemilasius*, three species of similar size and proportions, all have dark morphs which are blackish-brown with strikingly white bases to the primaries underneath; but only on the first of these is the uppertail often partly white. The dark morph of the Augur Buzzard *B. augur* of Africa is all black-brown except for its bright chestnut tail, which facilitates identification.

More than a dozen possible reasons for the presence of dark morphs in various animal species have been put forward by students of evolution. Among these, as argued by Paulson (1973), the most generally applicable to raptors is probably that of frequency-dependent selection. Applied to a predator, this hypothesis states that a potential prey will less easily learn to evade a predator that appears in different guises. (A predator whose preferred prey comes in different colours would have corresponding difficulties: that this is so has been statistically demonstrated.) Thus, as an alternative plumage appears by mutation in a raptor, it may – so long as it does not become too frequent – confer an advantage during hunting that compensates for possible drawbacks in other respects.

The argument is strengthened by the fact that other birds with a high incidence of melanism, such as herons (Ardeidae) and skuas (Stereorariidae), also feed primarily on visually alert prey; and that members of these groups that feed primarily on carrion, or on such defenceless prey as nestling birds, are only rarely polymorphic (Paulson again, though exceptions are provided by harmless species that mimic more capable raptors: see below). That this hypothesis may be difficult to verify in the field, even for birds as intensively studied as the skuas, was shown, however, in an interesting discussion by Furness (1987).

It must be stressed that no systematic study has been carried out to establish whether individuals of any morph differ from those of other morphs in feeding ecology. If they do, polymorphism could indicate a partitioning of food resources rather than a strategy to outwit a common prey. Detailed arguments to this effect were set forth by Murton (1971) for herons. The hypothesis of a niche difference between morphs would better suit the fact that substantial variations occur in the frequency of morphs between and within polymorphic species, and it could also help the understanding of why some species are polymorphic only in the juvenile plumage and others only in the adult. This explanation gains credibility through the observation by Preston (1980) that dark Red-tailed Hawks *Buteo jamaicensis* prefer less exposed perches than those used by their lighter-coloured conspecifics.

The incidence of melanism among raptor species varies from zero to over 90%. The proportion may be relatively uniform over the distributional range of a species (6.5–25% among Gabar Goshawks *Micronisus gabar* over much of Africa: Brown *et al.* 1982); vary at lower levels (a few percent in Rough-legged Buzzards in North America, with much local variation, but less than one per thousand and possibly even zero in the

Eurasian population: Dementiev & Gladkov 1951, and own data); or show more dramatic differences, such as from zero among east European Long-legged Buzzards to over half the population in Afghanistan (Dementiev & Gladkov 1951; for other temperate Asian raptors, see Stepanyan 1985). In the Bateleur, an erythristic morph with back and tail dark chestnut predominates, but a pale morph with these parts light buff or cream also occurs, especially in drier areas.

Most or all eumelanistic morphs are known in both adult and juvenile plumages. The chestnut and whitish morphs of the Bicoloured Hawk *Accipiter bicolor*, however, are seen only in juveniles, and the rare buffish ('*fulvescens*') morph of the Greater Spotted Eagle *Aquila clanga* is nearly restricted to juveniles, as also are the white-speckled varieties of the Common Buzzard *Buteo buteo* which are common in the southern part of the species' range. Conversely, dimorphism among Bateleurs has been reported only for adults.

Dimorphism (the presence of two morphs) is, however, not the only alternative to a 'standard' plumage, should such exist. On close examination, dark individuals of Wahlberg's Eagle *Hieraaetus wahlbergi* can be divided into four groups: one (moderately frequent) very dark brown group, one (frequent) dark brown, one (scarce) which is more olive-brown below, and one (scarce) dark rufous-brown. None of these is likely to be picked out in the field except as 'dark', whereas the pale white-speckled morph is highly characteristic but rare. The Booted Eagle *H. pennatus* is generally said to have two morphs, dark and light; but rufous individuals can be distinguished in good light conditions, and museum studies reveal that intermediates occur.

These examples suggest that 'melanistic' versus 'standard' is not always a matter of two alleles at a single locus that governs the production of either kind of melanin (though that may well be so at an initial stage). This becomes even more clear when we look at the Gyr Falcon *Falco rusticolus*, which in its arctic distribution unfolds a range of variants – from nearly white ('*candicans*') to very dark ('*obsoletus*': see Palmer 1988) – related only in part to sex, age and geography. A similar situation obtains in many so-called polymorphic species. The limited information available on the genetic background of polymorphism among birds has been reviewed by Harrison (1985), and additional data on skuas were presented by Furness (1987).

A more complex morphism occurs in other species. One South American race of the Sharp-shinned Hawk *Accipiter striatus ventralis* (sometimes considered a full species) is known to have blackish, rufous and pale forms in the adult plumage. The Hook-billed Kite *Chondrohierax uncinatus* of Latin America has been cited as the most variable species among raptors, but this position undoubtedly belongs to the Western Honey-buzzard *Pernis apivorus*, which features about ten different morphs that are differently distributed between juveniles and adults. It must be stressed, however, that the morphs of the Hook-billed Kite and the Western Honey-buzzard are not simply alternatives (as in most dimorphic species), but represent frequency peaks in a complex 'colour-pattern landscape' that must have evolved over a considerable period of time.

The reason for the great variability of the Western Honey-buzzard appears to be that it mimics more powerful raptors and so achieves protection from enemies (Edelstam & King in press). Since powerful raptors are relatively rare, selection has favoured the splitting of the mimic into a number of morphs, each of which models a particular small eagle so that – primarily in its African winter quarters where the Western Honey-buzzard, being insectivorous, spends more time than it does in its temperate breeding range – protection can be obtained from a variety of sources. Its Asian congeners, the Eastern *P. ptilorhynchus* and Banded Honey-buzzards *P. celebensis*, have been equally successful in copying local eagles, mostly *Spizaetus* hawk eagles, and have carefully adapted to their respective models not only in colour but also in the length of the nuchal crest, which varies from non-existent to very prominent.

Similarly, the Hook-billed Kite seems to mimic a set of local raptors, including the Bicoloured Hawk, forest-falcons *Micrastur* and two or three small buteonine hawks, which all fly faster and have stronger talons than does the kite (Edelstam, in prep).

It seems likely that instances of mimicry in this sense (not to be confused with so-called vocal mimicry, which involves learning, and not normally disguise) will be discovered among other timid raptors. This has been suggested for the Rufous-thighed Kite *Harpagus diodon* of South America in relation to the local race of the Bicoloured Hawk *A. b. pileatus* (see Willis 1976).

Conversely, the remarkable similarity of the Zone-tailed Hawk *Buteo albonotatus* to the Turkey Vulture *Cathartes aura* may be the result of its mimicking the vulture in order to approach potential prey unnoticed (Willis 1963), or to avoid being mobbed. It has also been proposed that the white morphs of the Grey Goshawk *Accipiter novaehollandiae* of Australia and of the Varied Goshawk *A. hiogaster* of New Guinea have evolved in response to the presence – over parts of those two species' ranges – of *Cacatua* cockatoos that are mainly white, are far more common than the goshawks, and thus may provide cover for it when it approaches its prey. The presence of white goshawks in Tasmania, where white cockatoos do not occur, does, however, slightly mar this attractive theory.

## ADAPTATIONS FOR FLIGHT

Avian flight has been the subject of many false interpretations, and a real understanding had to await the merging of ornithological and aerodynamic expertise. A series of papers by C.J. Pennycuick and J.M.W. Rayner represented landmarks in this respect; and both authors have provided highly informative reviews of the subject, including a technical background (Pennycuick 1975, summarised 1985; Rayner 1988).

Flight has evolved in association with changes in body shape, integument, skeleton, muscular and sensory systems, and respiration. Here, we are concerned only with plumage adaptations for flight among birds of prey. These run largely parallel to those of other birds. For example, the long, stiff, pointed wings of the falcons that hunt insects and small birds in the air – such as the Northern Hobby *Falco subbuteo* and its relatives – recall those of swifts of the genera *Apus* and *Chaetura*; and the elegant aerial evolutions of the Latin American Swallow-tailed Kite recall those of the much larger but similarly outlined frigatebirds *Fregata*. Counterparts of the big soaring eagles and vultures, likewise with short tail, long broad wings and deeply emarginated primaries, are the pelicans (Pelecanidae), cranes (Gruidae) and, particularly in the case of the New World cathartid vultures, the storks (Ciconiidae).

Three basic requirements govern the flight adaptations of raptors: the need to find and secure food; the need for aerial display at the time of breeding; and the need for sustained flight during migration.

Rapid manoeuvres in dense vegetation are facilitated by short broad wings and a good rudder in the form of a long tail. Standard examples are the accipiters and the forest-falcons, while the extreme is represented by the Long-tailed Hawk of African rainforest. The principle holds good for large birds also: the forest-haunting harpy eagles, such as the Crested Eagle *Morphnus guianensis* and the New Guinea Eagle *Harpyopsis novaeguineae*, have relatively short wings and quite a long tail. The elongated central rectrices of the Secretarybird, on the other hand, are an ornament of little consequence to flight.

A long tail may be useful also for longitudinal stability and for adjustments of tilt and direction when soaring and gliding. The large kites, which are the only long-tailed accipitrids (except for the Wedge-tailed Eagle *Aquila audax* and the Lammergeier) that soar a lot, and not only socially or on migration, will frequently move their tail axially in flight.

During hovering, raptors can be seen to incline the tail vertically. This is believed to help to divert the downflow of air over the wings into a vertical direction and so sustain lift (Pennycuick 1975). There appears, however, to be little connection between the length and shape of the tail and the habit of hovering, whereas all species that persistently use this foraging technique do have relatively long wings. These include the kestrels (*Falco tinnunculus* and its close relatives), six small kites (*Elanus* species, Mississippi *Ictinia mississippiensis*, Scissor-tailed *Chelictinia riocourii*) and certain medium-sized accipitrids such as the Osprey, Short-toed Snake-eagle *Circus gallicus* and a minority of the buteos, notably the Rough-legged, Long-legged and Upland Buzzards and the Ferruginous Hawk *Buteo regalis*. Other species will hover more occasionally: a Peregrine Falcon *Falco peregrinus* may do so, for example, in order to locate and recover lost prey, and even some long-winged accipiters, such as the Levant Sparrowhawk *A. brevipes*, have been seen to hover.

Rapid flight is facilitated by long pointed wings and a musculature capable of producing bursts of flapping. This makes for high wing-loading, calculated as weight divided by wing-surface area. Since wing-loading increases rapidly with weight, comparisons of performance should be made within size groups; data for a number of species arranged in this manner were given by Brown & Amadon (1968). Most falcons, accipiters, hawk eagles and the Lammergeier have high wing-loading, and harriers, large kites, buteos, large eagles and most vultures low wing-loading.

Low wing-loading facilitates soaring on thermal updraughts over sun-heated ground, and gliding on the dynamic winds rising on the windward side of a mountain or forest edge. The lower the load, the better the performance: a kite can use a narrower thermal than an eagle. As the warm-air bubbles tend to be small early in the day, Black Kites *Mitris migrans* will arrive at a carcass earlier on average than Hooded *Necrosyrtes monachus* and Egyptian Vultures *Neophron percnopterus*, which in turn will precede their larger relatives of the genera *Gyps* and *Aegypius*. The effects of differences in wing-loading may have been a decisive factor in size differentiation among scavenging birds (Hankin 1913, Cone 1962, Brown & Amadon 1968).

The large soaring raptors usually have a short tail, which may be square or rounded or wedge-shaped even on species that are traditionally placed in the same genus. The shortest tail of all is that of the adult Bateleur, the African snake-eagle which outdoes all others when it comes to riding on the wind over flatlands and whose flight silhouette, with stubby tail and broad but pointed wings, reminds one more of a bat than of a bird. Pennycuick (1975) suggested that the Bateleur may exploit the random turbulence over level ground for 'gust soaring'. The fact that the juvenile's tail is of more normal length for a sizeable raptor of open habitat suggests that the character is recently acquired; or the longer juvenile tail may be an adaptive concession to the need of the young bird to steer more cautiously before it learns the adult's daring aerobatics.

The long, graduated tail of the Lammergeier and the Australian Wedge-tailed Eagle is not associated with a common manner of flight. The eagle is a dedicated savannah soarer, whereas the Lammergeier

apparently owes its remarkable skill of riding at high speed on the dynamic winds along cliff edges and mountain slopes (as well as frequent soaring) to a combination of a long tail and long, relatively pointed wings not unlike those of a falcon. Its proportions do not, in fact, differ appreciably from those of the far smaller Eleonora's Falcon, which happens to be one of the few raptors that can match it in fast and agile 'hang-gliding' over rocky slopes.

Pennycuik (1975) made the point that the large soaring raptors would indeed do better in the air with wings having what is termed a high aspect ratio, such as those of a falcon or an albatross (Diomedidae), than with their present low-aspect-ratio wings, which may have developed primarily to facilitate take-off and landing in poor wind on level ground – a formidable challenge to any bird the size of a Griffon Vulture *Gyps fulvus* or, even more, an Andean Condor. Until the late Pleistocene, however – less than 15,000 years ago – there were much larger raptors around. These were the American teratorns: huge birds with wingspans of several metres and, though only distantly related, bodily proportions similar to those of the condors. The largest teratorn, the Patagonian *Argentavis magnificens* of the late Miocene, some five million years ago, had an estimated wingspan of 7 m – an all-time record – and is believed to have weighed around 80 kg. Campbell & Tonni (1983) suggested that this species was restricted to the realm of the South American westerlies, south of latitude 40°S, simply because it could routinely become airborne only in constant high winds. Therefore, when the Andes rose another 1,000–2,000 m during the Pleistocene and, as a consequence, the westerlies over the pampas lost momentum, the giant became grounded.

In an attempt to overcome their aerodynamic handicap, broad-winged raptors have evolved deep emarginations on their outer primaries and, by slotting these primaries both horizontally and vertically when flying at low speed, are able to increase stability and to lessen the induced drag on the distal edge of the wing in a manner that confers some of the advantages of a high aspect ratio (Hummel 1980). Although such slots are a standard feature of bird wings, the emarginations on the vanes of the long primaries of eagles and vultures are deeper than those of any other bird. In contrast, the emarginations on the primaries of falcons are short and are present only on the outermost one or two.

The demands made on plumage by aerial displays and migration have probably always been secondary to those of securing food. Male raptors of different sizes and flight silhouettes may all tumble impressively in the sky at the time of pair formation or when delivering food to the female in the air. Examples include harriers, eagles and falcons, and, although the flight performance differs among species, it does not suggest that any serious constraints are placed on this behaviour by wing shape or wing/tail proportions. At equal wing-loading, however, weight sets a limit to climbing speed during aerobatics; and, as pointed out by Norberg (1987), this may have contributed to making the male of many raptors smaller than the female of the same species.

Kites, vultures, sparrowhawks and falcons may all be successful in migrating despite their aerodynamic specialisations. They simply adapt to different travel strategies: some, such as the Osprey and the harriers, which are used to flying over water, do not shun the open sea; the Osprey, in addition, has strong flight muscles and is capable of long desert crossings. Others, such as kites, buzzards, vultures and eagles, keep strictly to the leading lines offered by coasts and mountain ridges, where winds – be they thermal or dynamic – provide assistance in soaring or gliding that suits their preferred way of flight.

It is interesting that some species which we are used to classifying as soarers do at times depart from this pattern. Thus, Western Honey-buzzards will often start their daily migration legs before the thermals have begun rising from the sun-heated ground (Rudebeck 1950); and, although a majority prefer the land bridges at Gibraltar, the Bosphorus and Suez, many habitually cross the central Mediterranean Sea by sustained flapping flight via Italy and Greece on their way between Europe and Africa. This marks a difference from the similar-sized (and quite similar-looking) Common Buzzard, which is more strictly limited to overland flight. Information in Brüll (1977) and our own data suggest that the wing-loading of the honey-buzzard is about 15% lower than that of the buzzard.

## BILLS

The proverbial hooked bill of raptors does not seem to have received much attention by students of comparative and functional anatomy, although a broad study of bill adaptations might be of interest to systematists and ecologists alike (but see Brüll 1977, pp.45–63, on differences in bill shape and function among the European species).

The shape of the bill includes a hook that terminates at right-angles to the gape and is used by most species for tearing apart flesh. In the case of the cathartid vultures this hook is quite modest (the bill of condors recalls that of a Capercaillie *Tetrao urogallus* rather than a raptor), but in the snail-eating kites of the genus *Rostrhamus* it is thin and very extended and serves to pierce the columellar muscle of snails before extracting them from the shell (Snyder & Kale 1983).

The edge of the bill is generally sharp and straight, or slightly sinuous in its basal half. In most

Falconiformes and a few kites, however, it has a so-called 'tomial tooth' on the upper mandible and a corresponding notch on the lower. Falcons use this tooth for killing prey by a neck bite that severs the vertebrae (a habit unknown among accipitrids), or for dismembering insects; in the case of the kites – some of which have a double tomial tooth – its presence is associated with a diet of insects or, occasionally, lizards.

Bill size is closely but not entirely related to the size of the bird. Species that feed exclusively, or to a large extent, on carrion (vultures, Crested Caracara *Caracara plancus*) have a distinctly heavier bill than do others. The difference in bill size between fish-eagles and the more actively hunting true eagles may have a similar background. Again, there are exceptions: two small Old World vultures, the Egyptian and the Hooded, as well as the Black Vulture *Coragyps atratus* of the Americas, have a relatively thin but very long bill that seems adapted to smaller food items; and the Turkey Vulture and a majority of the caracaras have a modest bill.

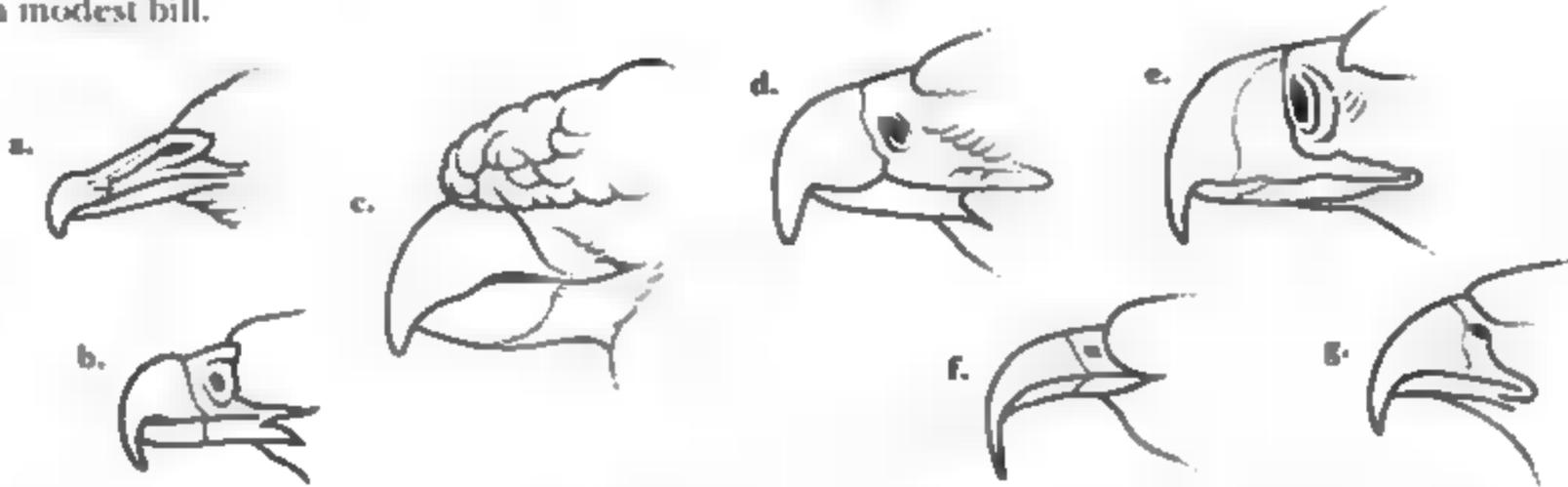


Fig. 19. Comparison of some raptor bills. Three vultures: (a) Black Vulture *Coragyps atratus*, (b) Monk Vulture *Aegypius monachus*, (c) Andean Condor *Vultur gryphus*. Two harpy eagles: (d) Harpy Eagle *Harpia harpyja*, (e) Philippine Eagle *Pitheophaga jefferyi*. Two kites: (f) Snail Kite *Rostrhamus sociabilis*, (g) Hook-billed Kite *Chondrohierax uncinatus*. See text for discussion.

It is tempting to make an historical comparison. The large raptors of the family Teratornithidae, with their enormous laterally compressed bills, became extinct when the American large-mammal fauna (apart from the bison) disappeared and left them without sizeable carrion for food; whereas the heavy-billed *Gyps* and *Aegypius* vultures of Africa and southern Asia still persist with a varied community of large mammals at their disposal. (It has been claimed, though, that the bill of the teratorns was not suited for eating carrion: Campbell & Tonni 1981.)

Certain problems of feeding may be solved by alternative means. Two of the three large monkey-eating eagles – the Afrotropical Crowned and the Neotropical Harpy – have a very strong but typically aquiline bill, whereas the Philippine Eagle has an exceptionally high and laterally compressed bill more reminiscent of that of the teratorns. Both solutions seem to work; but it would be nice to know how they came to differ.

Some more subtle differences in bill shape cannot be appreciated in the field. For instance, the Bat-hawk's tiny bill has, for obscure reasons, a strangely compressed dorsal ridge; and the condors, the King Vulture, the Osprey and the snail-eating kites have a bill that is slightly more cylindrical than that of most species, which seems obviously adaptive in the kites but less easily explained in the others. The Hook-billed Kite, which also feeds on snails, has a bill very different from that of the snail kites, high and laterally compressed though still with an elongate hook; it usually crushes the shells of its prey.

The colour of the bill varies from a dirty white in the Andean Condor to jet-black in several species. The tip is often darker than the rest (cf. remarks above on the strength of melanin), but on species which have light-coloured bills the parts adjacent to the cere may be darker. With some heavy-billed raptors, notably fish-eagles, bill colour is one of the signs of age: the bill of the Bald Eagle *Haliaeetus leucocephalus* and its close relative, the White-tailed Fish-eagle, is dark horn for the first two years, turns lighter in the third and becomes dull yellow on the adult.

The base of the upper mandible of raptors is covered by a tough keratinous membrane called the cere. This may be broad, as on the fish-eagles, or narrow, as on the Hook-billed Kite and the Afro-Asiatic pygmy-falcons *Polihierax*. Its colour may be the same as that of the bill, or contrast with it. Young honey-buzzards have a yellow cere that in the second year becomes dark-flecked and at two years of age is as black as the bill; this may serve as a signal of age that remains reliable in a species whose exceptional plumage variation might otherwise confuse even conspecifics.

In the cere are situated the nostrils, which are rounded or oval as a rule and, in the Falconiformes, have a central bony tubercle of unknown function. Slit-shaped nostrils are typical of species which dive for fish or handle gory food, such as the Osprey, honey-buzzards, gymnogenes, some fish-eagles and some Old World vultures, notably those of the genus *Gyps* (the large Monk Vulture has rounded nostrils and those of other species are of intermediate shape). Slit-shaped nostrils are found also on two of the

Afrotropical snake-eagles, the Banded *Circus cinerascens* and East African *C. fasciolatus*, whose food specialisations include some highly poisonous snakes: one may hazard a guess that this represents an adaptation to the handling of spitting cobras.

The nostrils of the Crested Caracara are unusually small and aberrantly positioned, being closely set at the very top of the cere on an extremely stout bill. In the cathartid vultures, the internasal septum is incomplete and provides an open view sideways through the nostrils.

## LEGS AND FEET

The functions of the variously sized and shaped legs and feet of certain raptors have been analysed in, for example, the systematic-ecological treatises of the genus *Accipiter* by Wattel (1973) and the genus *Circus* by Nieboer (1973), and in a broader context by Brüll (1977, pp. 45–63).

The length and strength of the legs and feet are highly adaptive. The Secretarybird stands as tall as a crane on its 30-cm tarsi, which help it to keep its distance when handling snakes. With other species, such as the caracaras, long tarsi are commonly associated with the habit of walking. They may also help to create drag on landing (Pennycuik 1975, and cf. below).

In a comparison among related species, one will find proportionally longer tarsi on the aerially hunting accipiters than on those that go for terrestrial food (Wattel 1973), whereas the opposite obtains among falcons (Stresemann 1927–34). This difference between groups is probably the result of differences in the ways in which they secure their prey.

Long, slender tarsi are characteristic of harriers, which plunge on to prey in dense grass, and of the gymnogenes and Crane-hawk *Geranoospiza caerulescens*, which reach into crevices and tree holes for their food. Gymnogenes and Crane-hawks also have the facility, as do no other birds, for backward flexion of their intertarsal joints, by 75° in the case of the African Gymnogone (Burton 1978), to assist in their peculiar foraging activities.

The tarsi of those eagles and fish-eagles that attack heavy prey on the ground or in water are strong and relatively short; and the Osprey's are exceptionally short for a raptor of its size, perhaps designed to minimise drag when rising from dives. By contrast, the feet of the Black-collared Hawk, a Latin American species that prefers not to get wet when fishing, are fairly long.

It seems less clear why some birds of prey have the tarsi fully feathered and most others do not. Feathered legs may suggest an adaptation to cold conditions in the cases of the Golden Eagle and Rough-legged Buzzard, but all the true eagles have them, including the tropical *Spizaetus* and *Spizastur* hawk eagles, whereas even the three northern fish-eagles have nearly bare tarsi. Among vultures, the Lammergeier and the Monk Vulture depart from the rule that the tarsi of carrion-eaters are entirely or partly bare. (Since the tarsal feathers in most of these cases conform in colour to the rest of the plumage of the underparts, a signal function analogous to that described by Brown & Amadon 1968 for the chestnut 'flags' of the Northern Hobby does not seem to apply.)

The 'bare' tarsi of other raptors are covered by rows of scales; or by a less organised reticulated pattern of flattened scales; or by rounded granular scutes. The second type is found among vultures and the third primarily on those species that feed in part on snakes; but the Secretarybird's tarsi, as an exception to the rule, are covered at the front by a single row of broad, regular plates.

The proportional length and strength of the four toes, and of their claws, vary considerably among species depending on choice of food and way of foraging. The claw of the hind toe is, as a rule, the largest, although not on the vultures, whose feet are adapted for walking. On most species, the claw of the outer (fourth) toe is distinctly smaller than the rest, but it is more equal in size on the falcons; and also on the Osprey and fish-eagles, which apparently have to use all available means to hold on to their slippery prey. As a further adaptation in this direction, the Osprey's outer toe is reversible, like that of owls.

The width of the extended talons is important for grasping prey that is moving fast or cannot be located precisely during an attack, such as in aerial pursuit (falcons, accipiters) or when plunging on small prey in dense vegetation (harriers). This is probably why compact species like the Peregrine Falcon and Bat-hawk have toes and claws which, for the birds' size, are long, but not very sturdy. Feet of that kind are intended primarily for grasping and transporting prey which has been immobilised by impact. The feet of most falcons, harriers and accipiters also have a particularly long middle toe (though this is true also of the walking feet of many vultures).

That the slender feet of a Northern Sparrowhawk are capable not only of catching, but also of killing, prey of the raptor's own size was demonstrated when some colleagues in Stockholm, Sweden, received a slightly injured male sparrowhawk entangled with a dead Merlin *Falco columbarius*; dissection showed the Merlin to have died from the puncturing of its lungs at three points as the hawk grasped it with one foot over the back.

Eagles are equipped primarily for catching large prey on the ground or on branches, where the victim

can often hold on and struggle on the spot. Therefore, they often have very strong feet and claws. Even among eagles, however, this is subject to qualification, for the almost disproportionately heavy feet of some of the *Spizaetus* hawk eagles (e.g. the Javan *S. bartelsi* and Sulawesi *S. lanceolatus*), compared with the relatively slender feet of the similarly sized Wahlberg's Eagle and Black-and-white Eagle, no doubt reflect a significant difference in the choice of prey. As may be expected from what we know about their manner of foraging, the largest accipiters (Northern Goshawk, Great Sparrowhawk *Accipiter melanoleucus*, and a few more) have taken an intermediate course, and have longish but also rather strong toes and claws.

The snake-eaters, on the other hand, have comparatively heavy feet with strong but short toes and claws, which are used to pin down the victim until it can be grasped near the head by the bill and killed. This is seen at its extreme in the Secretarybird, but applies also to the serpent- and snake-eagles. The tendency persists in buteos, such as the Common Buzzard, that feed on reptiles more than occasionally, although this correlation may be spurious, as short talons are good also for catching small rodents.

With the exception of the Lammergeier (which is hardly a typical vulture, in any case), the vultures have feet for walking that are reminiscent of those of a hen and cannot be used for transporting prey: all food has to be carried in the neck-pouch. Their feet, however, are quite strong because of the need of the larger species to make a running start to get airborne in poor wind (Pennycuik 1975), and for use in combat over food. On the other hand, and in line with their habits, the carrion-eating caracaras, which are Falconiformes, have short talons with moderately curved claws, which they are able to use for carrying food. A remarkable detail of all vultures – including the unrelated American cathartids – is the slight webbing of the feet, especially between the middle and outer toes, which has been explained as a means of increasing drag on landing (Pennycuik 1975).

The pads on the undersides of the toes are rather differently developed in the different raptor groupings and species. Three extremes are: the densely set, spiny projections under the toes of the Osprey, some fish-eagles, and the Black-collared Hawk, which ensure a better grasp of the fish; the extensive and very thick toe-pads of the Secretarybird, similar to those of other large stalkers, such as bustards (Otididae); and the smaller but strongly projecting ones that may improve the grip of those accipiters and falcons that grasp their prey in the air (cf. Lennerstedt 1985). These are compared in Fig. 20.

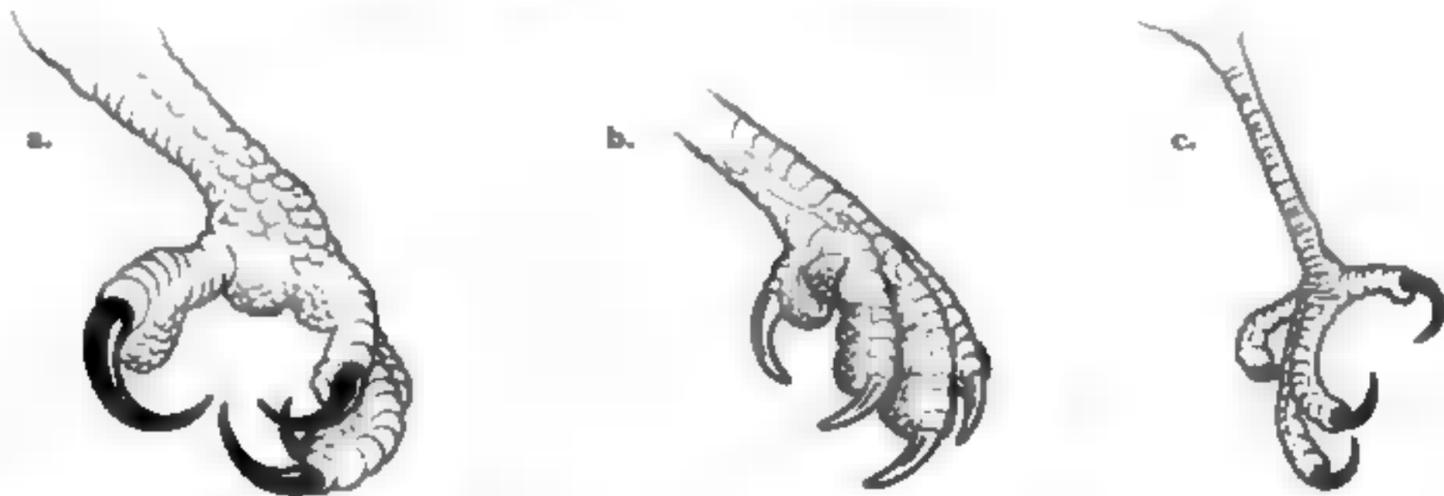


Fig. 20. Feet of three raptors, showing extremes of development of pads on undersides of toes. (a) Osprey *Pandion haliaetus*, (b) Secretarybird *Sagittarius serpentarius* and (c) typical accipiter.

The claws of raptors are roughly half-oval in cross-section with the flat side down. On the underside, close to the edges of the forward-directed claws, there may be the development of a groove, which makes the edge work like a knife when the bird uses its bill to tear pieces of meat from prey held by the talons. This trait is very prominent on the inner edge of the middle claw of all eagles and fish-eagles, less prominent on many other species and, though absent on the two condors, still present on the related King Vulture.

Strongly curved claws are found in such distantly related groups as ospreys, fish-eagles and hawk eagles. The hindclaw of the Madagascar Fish-eagle will occasionally bend through a curve of 180° and measure nearly 50 mm across the arc. In contrast, the claws of snake-eagles, honey-buzzards, and species that feed on carrion are less curved and not very useful for carrying prey: the snake-eagles prefer to transport their victims in the bill.

As already noted in relation to bill shape, similar foraging problems may be solved by different means. The two *Rostrhamus* kites and the Hook-billed Kite all forage successfully for snails, although the latter extracts the molluscs in a less sophisticated manner. The former both have feet with long slender toes and long, thin, moderately curved claws evolved presumably for handling fragile shells (cf. the similar but larger claws of the Indian Black Eagle *Ictinaetus malayensis*, which may be adapted for snatching eggs from nests; Stresemann 1927–34). The Hook-billed Kite, in contrast, has somewhat stouter but short toes and more curved claws; its bill, as stated earlier, is also very different.

# TAXONOMY, SEQUENCE AND NOMENCLATURE OF RAPTORS

No sequential list can ever do justice to the branches of the evolutionary tree, especially for such a large and heterogeneous conglomerate as the diurnal birds of prey. Indeed, the affinities of many raptors have proved extraordinarily difficult to disentangle. Even considerations of arguments based on anatomy (e.g. Jollie 1976-77), external morphology, plumage, moult, ecology, behaviour, voice, distribution and the fossil record still leave doubt about the phylogenetic relationships of some major groups and many genera and species.

Adaptive convergence may produce similarities between species or families that are only distantly related. Conversely, some striking external traits may be the result of relatively rapid adaptation of limited generic consequence. Egg-white analyses (Sibley 1970, Sibley & Ahlquist 1972) and subsequent feather-protein studies in various parts of the world both clarified some problems and showed up others. The later DNA-DNA hybridisation work (e.g. Sibley & Ahlquist 1981 *et seq.*, Ahlquist *et al.* 1987) and, more recently, the sequencing of nuclear and mitochondrial DNA are revolutionising our thinking, but it will be some years before the picture is complete. Thus, the classification in this book remains conventional.

## ORDERS AND FAMILIES

The taxonomy and sequence of Brown & Amadon (1968) were followed in world lists for some years (e.g. Morony *et al.* 1975). Next, Voous (1973) divided the former single order of the Falconiformes into three, separating the Cathartiformes (New World vultures) and Falconiformes (caracaras, falcons) from the rest, which became the Accipitriformes. He divided the Accipitriformes into two suborders, the Accipitres (kites, fish-eagles and vultures through to hawks and eagles) and the Sagittarii, the latter containing the Secretarybird *Sagittarius serpentarius* on its own. These divisions have been followed by many authors (e.g. Cramp & Simmons 1980, Campbell & Lack 1985), but here we have tentatively raised the extraordinary Secretarybird to ordinal rank.

This singular, long-necked, long-legged, terrestrial species has in the past been suggested to have affinities with the storks (Ciconiidae), cranes (Gruidae), seriemas (Cariamidae) and bustards (Otididae). If such possibilities seem unlikely, it should be understood that the DNA-DNA hybridisation studies and earlier protein research have shown the New World vultures to be actually closely related to the storks, not to the other raptors, the similarities of appearance and behaviour being the result of evolutionary convergence. It must be added, however, that the new DNA-based classification (Sibley *et al.* 1988, Sibley & Monroe 1990) – still by no means universally accepted – places the Secretarybird in a monospecific family within the parvorder Accipitrida (equivalent to the order Accipitriformes); its affinities had earlier been discussed by Sibley & Ahlquist (1985).

The elevation of the old Falconidae to ordinal rank has the advantage of enabling its distinctive subfamilies to be treated as families: the Daptridae (caracaras) and Herpetotheridae (primitive South American falcons, including *Spizapteryx* – see Olson 1976 – and *Micrastur*) are sufficiently different in structure, breeding and, especially, behaviour.

The Pandionidae is here kept as a family within the Accipitriformes, but both Amadon & Bull (1988) and Sibley & Monroe (1990) relegated it to subfamily level within the Accipitridae.

## RELATIONSHIPS AND SEQUENCE

In general, the sequence used in this book is that of Stresemann & Amadon's revision (1979) of the first volume of J.L. Peters's *Birds of the World*; that was, in effect, an update of Brown & Amadon (1968). The main exception is that our sequence for *Accipiter* follows Wattle (1973), although we treat as species some that he regarded as races. Soon after we were committed to this sequence, Amadon & Bull (1988) introduced changes that we might have followed, but by that stage it would have been too complicated to alter the numbering. Even a late decision to transfer Wahlberg's Eagle *Hieraaetus wahlbergi* from *Aquila* (following Smeenk 1974) meant its having to be moved by seven places.

Among the more significant differences in Amadon & Bull's list are the positions of *Melierax* (including *Micmnisus*), long placed immediately preceding *Accipiter*, and of *Kaupifalco* and *Butastur*, long treated as buteonines. Amadon & Bull put all these genera between *Polyboroides* and *Circus*. Kemp (1986) suggested that the small Afrotropical (or Afro-Malagasy) genera of *Polyboroides*, *Melierax*, *Kaupifalco* and *Urotriorchis* were probably relatively closely related descendants of a common ancestor. He did not, however, put *Butastur* with this group, and Sibley & Monroe (1990) left *Urotriorchis* and *Butastur* between *Accipiter* and the buteonines. We have not attempted to move any of these genera from their traditional places, partly

because of the difficulty of amending our sequence after 1988, but also because these problems are clearly not yet finally resolved.

The chanting-goshawks *Melierax* provide a good example. As Carl Edelman (*in litt.*) put it, 'In spite of their modest size, they are serial moulters [see 'Raptor moult patterns and age criteria', pp. 50–53] and so probably not accipitrines.' Much of their behaviour is also very distinct. On the other hand, the Gabar Goshawk *Micronus gabar*, although often placed with the chanting-goshawks in *Melierax*, is patently quite different from them and much closer to *Accipiter*. Its hunting behaviour, general proportions and lack of serial moult are similar to those of *Accipiter*, not *Melierax*. As Edelman (*in litt.*) continued, 'It could simply be an accipiter mimicking a chanting-goshawk – including, less perfectly, its voice – in order to fool its prey of passerine birds.' The Gabar also takes aerial insects, whereas all *Melierax* feed mainly on reptiles and ground insects. We have therefore placed it first among the accipitrines (see below) instead of last among the chanting-goshawks.

It has been hypothesised, on the basis of morphology, breeding biology and behaviour, that several small Australasian genera, including not only the 'kite types' of *Henicopernis*, *Lophoictinia* and *Hamirostra*, but also the 'accipitrine' *Erythrotriorchis* and *Megatriorchis*, may comprise an ancient clade of endemic kites unrelated to Eurasian species (Schodde 1993). Form, behaviour, nestling downs and immature plumages also suggest that *Erythrotriorchis* is closer to the kites than to the accipiters (e.g. Olsen & Olsen 1989).

Although they make up a particularly heterogeneous collection, we have followed previous practice in grouping the 17 genera from *Aviceda* through to *Mihus* and *Haliastur* as 'kites'. We have even left the Bat-hawk *Macheiramphus alcinus* in the middle (where it is sometimes placed in a subfamily of its own); it differs, however, from all kites in moult, number of secondaries (for no obvious adaptive reason), bill shape and foot pads and, if a 'kite' at all, would be better placed first in this group (rather than at the end, which leads into the fish-eagles).

Apart from the above possible additional Australasians, it has also been proposed that aberrant kites might include the apparently buteonine Black-collared Hawk (or 'Fishing Buzzard') *Busarellus nigricollis* of Central and South America (Olson 1982) and the specialised nest-robbing Indian Black Eagle *Ictinaetus malayensis* of southeast Asia (Amadon & Bull 1988). Both, however, are serial moulters and so probably not kites.

The Palmnut Vulture *Gypohierax angolensis*, no longer necessarily regarded as a link with either the fish-eagles (Olson 1982) or the Old World vultures (Rich 1980), may even be related to the serpent-eagles, so Amadon & Bull placed it between the Old World vultures and the serpent-eagles. They also rearranged the Old World vultures in accordance with Mundy (1984), which included leaving the Egyptian Vulture *Neophron percnopterus* and Lammergeier *Gypaetus barbatus* to the last, but were 'not convinced...that *Gypaetus* is indeed a vulture'.

It will be realised from this necessarily brief and superficial discussion that much remains to be learnt about the affinities of a number of individual species of diurnal raptor. DNA studies should eventually help to provide some of the answers.

Meanwhile, whatever sequence be adopted, the huge family of the Accipitridae, comprising 241 of the 318 species recognised here, is unwieldy without some subdivision. We debated reviving the old subfamilies, but, for example, these split the kites into three (putting the fish-eagles with the third subfamily) and grouped all the buteos, buteonines, harpy eagles and true eagles in one. Therefore, in the list of species on pp. 6–13, the Accipitridae are divided into 20 artificial groupings that will perhaps be more helpful in field terms. These separate the bazas, honey-buzzards and 'atypical kites' in one group from the Bat-hawk, the white-tailed kites, the true kites, and the fish-eagles and fishing-eagles in four, and the Palmnut Vulture and the Lammergeier in two groups separate from the typical Old World vultures; and a further 12 groups comprise, respectively, the snake- and serpent-eagles, the gymnogenes, the harriers, the chanting-goshawks, the Gabar Goshawk, the true accipiters, a sink of hawks of uncertain position (*Erythrotriorchis*, *Megatriorchis*, *Urotriorchis*, *Butastur* and *Kaupifalco*), the buteonines, the harpy eagles, and three groups of true eagles made up of the Indian Black Eagle, *Aquila* eagles, and hawk eagles.

Finally, some speculation about the American Crane-hawk *Geranoospiza carrulescens* and the Old World gymnogenes *Polyboroides* seems appropriate here. At one time these two genera were always placed together, and Brown & Amadon (1968) continued to associate them because of their similarities in shape (but not size), coloration, and long 'double-jointed' tarsi and short outer toe (which combine into unique foot adaptations), as well as broad secondaries and a weak bill. They are also similar in their feeding behaviour of pulling young birds from holes and other nests. Burton (1978), however, concluded from skeletal examinations that 'the resemblances of the hind limbs of these two genera are not strong evidence of phylogenetic relationship'. Later, Amadon (1982b) reasoned that the Crane-hawk belonged with the buteonines (or 'sub-buteonines'), and all recent lists, including Stresemann & Amadon which formed the basis of ours, have placed it just before the 'white hawks' *Leucopternis*. It is not a typical buteonine,

however. An obvious solution for our purpose would be to move it back into the 'Hawks of uncertain position', but it is a serial moult whereas they all have a complete annual moult. With the sequence fixed, the best we can do is to emphasise that it may not belong with the typical 'hawk' group of *Buteo* (and certainly not with the other 'hawks' in *Accipiter*) by giving it a hyphen ['English names of raptors', pp. 76–79].

Although *Geranospiza* and both *Polyboroides* species are all characteristically sedentary raptors ['Raptor migration', pp. 44–49] and the continents separated at a time when no modern bird genera are thought to have existed, an accipitrid skeleton 49 million years old from the Messel oil-shale, now in Frankfurt Museum, and other recent finds will force some remoulding of ideas of avian phylogeny (C. Edelman *in litt*).

We hope that this discussion, and not least the Crane-hawk example, will have illustrated the doubts and problems generalised in the opening paragraph of this whole chapter. The Afro-Malagasy 'buteonines' and the Australasian 'kites' also demonstrate the risk of ending up with sinks for species one does not know what to do with.

## GENERA

Plates 1–3 show examples, in flight, of each of the 78 genera recognised here ['Using this book', p. 20]. It may be useful to make clear the changes, by combination or division, from Brown & Amadon (1968); some, but not all, accord with Stresemann & Amadon (1979) and Amadon & Bull (1988).

We have followed these latter authors in combining three previously monotypic genera of Old World vultures – *Torgos*, *Trigonoceps* and *Sarcogyps* – with *Aegyptius* and the buteonine *Heterospizias* with *Buteogallus*. On the other hand, because of its accipitrine hunting behaviour, proportions and wing moult (p. 70), we have not placed the Gabar Goshawk with the chanting-goshawks in *Melierax*, but have retained it in *Micronisus*; nor, in view of the questions raised about their affinities (p. 70), have we combined the Australasian *Erythrotriorchis* and *Megatriorchis* with *Accipiter*. Also, *Erythrotriorchis* here includes Bürger's (or 'Chestnut-shouldered') Hawk *E. buergeri*, previously placed in *Accipiter*.

We have, as already noted (p. 69), transferred Wahlberg's Eagle to *Hieraetus* from *Aquila*, and we suspect that the Grey-lined Hawk *Buteo nitidus* might be better removed into the monotypic genus *Asturina* (Amadon 1982a). Amadon (1982b) reasoned that four previously monotypic genera of eagles should be synonymised with larger genera (*Polemaetus* with *Hieraetus*, and *Lophaetus*, *Stephanoetus* and *Omaetus* with *Spizaetus*), but we have not followed this. Nor have we revived *Iercoides* (Peters 1931) for the Brown Falcon *Falco berigora*, despite the tentative support of Amadon & Bull: Olsen *et al.* (1989) have underlined its relationship to the New Zealand *F. novaeseelandiae*, Black *F. subniger* and Grey Falcons *F. hypoleucos*, but again it was too complicated to amend the sequence.

## SPECIES

The number of species recognised here is 313; 27 forms treated by Brown & Amadon as races are raised to specific level, while Kleinschmidt's Falcon *Falco kreyenborgi* is now considered only a variant of the South American race of the Peregrine Falcon *F. peregrinus cassini* (Ellis & Garat 1983).

Species are groups of interbreeding natural populations that are reproductively isolated from other such groups (Mayr 1969). Unfortunately, we cannot always be sure whether forms effectively separated by seas, mountain ranges or other geographical features are indeed reproductively isolated.

The concept of 'superspecies' as groupings of closely related and largely allopatric species [asterisked on the species list] is invaluable in recognising affinities, but we find it hard to accept the idea of 'megasubspecies' being races which so approach the species level as to be almost deserving of the status of allospecies (Amadon & Short 1976). On this basis, Stresemann & Amadon (1979) designated a variety of raptor forms as megasubspecies, defined as 'a subspecies (or cluster of subspecies) known or judged to be approaching species status'. It is some of these that we consider better treated as species.

Certain of these elevations to full species have been increasingly accepted in recent years. Into this category in Africa, for example, comes the separation of the Eastern (Pale) Chanting-goshawk *Melierax poliopterus* from the distinctive and more southerly Pale Chanting-goshawk *M. canorus*; the two are totally isolated from each other by nearly 1,500 km occupied by the third member of this superspecies, the Dark Chanting-goshawk *M. metabates*. Also universally separated as species, and now known to overlap with reproductive isolation in Namibia, are the Augur *Buteo augur* and Jackal Buzzards *B. risofuscus*; the Augur differs in plumage, proportions and voice, and in having a black morph.

### Widespread Afro-Palaearctic species pairs

The Eastern Honey-buzzard *Pernis ptilorhynchus* is now generally regarded as specifically distinct from the Western *P. apivorus*; although the two are alleged occasionally to interbreed west of the Yenisey, they differ constantly in wing shape and emargination, foot size, crest development, and wing and tail markings. It is sometimes proposed that there should perhaps be a further division of the migratory Siberian and Japa-

nese *orientalis* from the variably crested and more sedentary *ptilorhynchus* forms of southeast Asia, but the case is weak. Incidentally, the variable crests are thought to be adaptations for mimicking the local hawk eagles (Edelstam & King in press).

Also now separated on behaviour, ecology, plumage and size are the African Hawk Eagle *Hiernaetus spilogaster* and Bonelli's Eagle *H. fasciatus* of Eurasia. These two were thought to be widely isolated geographically until *fasciatus* was found in southwest Arabia, and more recently in ecologically similar Djibouti (Welch & Welch 1988), whereas neighbouring Ethiopian birds all appear to be *spilogaster* (Dr JS Ash *in litt.*). There may well prove to be an overlap in that corner of Africa.

A third now generally accepted Afro-Palaearctic species pair involves the red-footed falcons, formerly regarded as conspecific. Apart from the white wing-linings of the male, the plumage of the female Eastern Red-footed Falcon *Falco amurensis* is very different from that of her Western counterpart *F. vespertinus*. There is a clear gap in the Asiatic breeding distribution, and the South African winter quarters are also largely discrete.

In contrast, we believe that there is no comparable case for treating as specifically distinct the western and eastern populations of two other widespread Afro-Palaearctic birds, the Black Kite *Milvus migrans* (Black-eared Kite *lineatus*) and the Northern Marsh Harrier *Circus aeruginosus* (Eastern Marsh Harrier *silonotus*) (see next section).

### Further controversial cases

Brown & Amadon (1968) treated the rather sedentary Beaudouin's Snake-eagle *Circus beaudouini* and the Black-chested Snake-eagle *C. pectoralis*, both of Africa, as conspecific with the migratory Short-toed Snake-eagle *C. gallicus* of Eurasia, which winters in Africa, because of the occasional occurrence of mixed pairs in Ethiopia (Brown 1974a). But the evidence was thin, with only one instance of nest and eggs, and no proof of fertility. Plumage differences, lack of intermediates, and, not least, significant distinctions between adults and juveniles of the two African forms (but not of *gallicus*) cause us to treat them as three species.

The same applies to the Hen Harrier *Circus cyaneus* of Eurasia, the Northern Harrier (formerly 'Marsh Hawk') *C. hudsonius* of North America and the Cinereous Harrier *C. cinereus* of South America. It is more customary to regard the Holarctic pair as one species and *cinereus* as another that is 'perhaps conspecific' (Amadon & Bull 1988). They are similar in structure and habits, and largely confined to temperate and cold climates (Nieboer 1973), but, with geographical isolation, have developed significant plumage differences. In a number of ways, *hudsonius* is more like *cinereus* than like *cyaneus* for example, the males of both New World forms are closer to each other than to *cyaneus* in having less extensive black on the tips of the outer five primaries, more tail-barring, and rufous or blackish markings on the white underbody and wing-linings; females and immatures are also more clearly distinct from each other in the American forms. Even more difficult is the marsh harrier complex. The Australian *Circus approximans* and the Malagasy *C. maillardi* are now often regarded as specifically distinct from the Northern *aeruginosus*, as here, but Amadon (1978), Stresemann & Amadon (1979) and Amadon & Bull (1988) also treated the eastern Asiatic *silonotus* as a distinct species, despite the evidence of its interbreeding with *aeruginosus* in Asia (Vaurie 1965). A further complication is the New Guinea *spilothorax*, which resembles a darker and more heavily streaked *silonotus*, and is often regarded as an isolated population of that. More logical alternatives are perhaps to give it specific status or, as here, to consider it a distinctive race of the Australian *approximans*. The females are rather similar, the males very different: the male plumage characters of *spilothorax* are exaggerated, whereas in *approximans* the sexes are more alike, but this seems likely to be of limited genetic consequence.

Separation of the migratory Steppe Eagle *Aquila nipalensis* and the sedentary Tawny Eagle *A. rapax* was surprisingly not accepted by Snow (1978), Stresemann & Amadon (1979) or Amadon & Bull (1988), but most observers in Africa regard them as distinct on size, structure, eye colour, immature plumages and behaviour (Brooke *et al.* 1972 and many other authors). We certainly do. Sibley & Monroe went further still and treated the southern Asiatic *vindhiana* as a third species.

On a more local scale, the Mangrove Black Hawk *Buteogallus subtilis* of Central America is here separated from the larger, less specialised and far more widespread Common Black Hawk *B. anthracinus*; and the Andean White-throated Hawk *Buteo albigula* from the allopatric lowland Short-tailed Hawk *B. brachyurus*, which not only differs in plumage but also has a black morph.

Brown & Amadon (1968) regarded the Lined Forest-falcon *Micrastur gilvicollis* as a race of the Barred *M. ruficollis*, with the Plumbeous *M. plumbeus* a separate species related to the former. Schwartz (1972) then showed *gilvicollis* to be 'a valid species sympatric with *M. ruficollis* in Amazonia'; he treated *plumbeus* as a race of *gilvicollis*, but thought that it might be separate as it has clearly been isolated for a long time. Hilty & Brown (1986) also considered *plumbeus* a good species. In the present state of knowledge of this difficult and secretive genus, we think it more realistic to regard it as distinct, and the same view was taken by Sibley & Monroe (1990).

The Altai Falcon *Falco altaicus* is a high-altitude and relatively early-breeding form often treated as a race of Saker *F. cherrug* and sometimes of Gyr Falcon *F. rusticolus*; it may even be a hybrid. A DNA link with Saker has been established, but its exact taxonomic position is far from clear. In all the circumstances, we have chosen to follow Vaurie (1965) in regarding it as a species, forming a superspecies with Saker Falcon, while realising that most authors would now treat it as conspecific with, or simply a morph of, Saker.

Brown & Amadon (1968) treated the mainly south Palearctic Barbary Falcon *F. peregrinoides* as a race of the cosmopolitan Peregrine Falcon; many others have done the same, including del Hoyo *et al.* (1994). We prefer to follow the wide range of authors from Vaurie (1965) and Voous (1977) to Amadon & Bull (1988) and Sibley & Monroe (1990) who have given it specific status. The two do largely replace each other geographically, but hybrids are infertile and there is no intergradation even where their ranges come close or, as in northwest Africa, evidently overlap.

Lastly in this section, Forbes's Kite *Leptodon forbesi* was long known only from the type, from Pernambuco in northeast Brazil, in the Natural History Museum at Tring, which is also the sole specimen that we have been able to examine. It was considered by Brown & Amadon (1968) to be a variant of the Grey-headed Kite *L. cayanensis*, but then came reports of adult and juvenile specimens from adjacent Alagoas (Teixeira *et al.* 1987a, b; Teixeira 1990-97 *in litt.*). Amadon & Bull (1988) concluded that the status of the taxon must remain indeterminate, and the details of the more recent Brazilian specimens have still not been published at the time of going to press. It does, however, now seem likely that this is a good species and perhaps the rarest and most endangered raptor of all, so we have built in a brief text with line-illustrations as species 14a.

### **Spilornis serpent-eagles**

Island populations, particularly of raptors, which in general are reluctant to make sea-crossings, tend to have isolation forced on them. One of the most complex raptor groups, the serpent-eagles of the genus *Spilornis*, is spread from the Indian subcontinent and southeast Asia through the islands of Malaysia, Indonesia and the Philippines. Of no fewer than 26 recognised forms, five are mainland races of the Crested Serpent-eagle *S. cheela*. The remaining 20 are island forms that vary greatly, both in size (so much so that the smallest is only about three-fifths as big as the largest, and well under half its weight) and in colour saturation (so that adults vary from black-brown or purplish-brown to pale brown above and from blackish-brown through chestnut to buff below, heavily spotted or barred to unspotted). The populations of the Andaman Islands (*elgini*), Great Nicobar Island (*klossi*), the Philippines (*holospilus*) and Sulawesi (*rufipectus*) have long been regarded as distinct species, and the rest usually as further races of *S. cheela*.

Amadon (1974) reviewed the genus, with particular reference to the populations of the Andamans and Borneo, and considered that there might be as many as nine species. He went on, 'One hesitates, however, to set up as species six or eight forms which most authors in recent years have treated as subspecies. To list them as species, moreover, would be to obscure to some extent the fact that in the Andamans, and only there, do we have two sympatric and hence indubitable species.' He therefore treated most of them as races of *cheela*, but adopted the convention of placing the species name in brackets, a convention later used by Stresemann & Amadon to indicate 'megasubspecies', of which they recognised nine in this group. More recently, Amadon & Bull (1988) demoted *holospilus* and *rufipectus* back to races of the mainland *cheela* and otherwise recognised as species only *kinabaluensis* of montane Borneo, *minimus* (including *klossi*) of the Nicobars, and *elgini* of the Andamans. But Sibley & Monroe (1990) raised them again to full species.

The recognition of *elgini* and *kinabaluensis* as full species is inevitable, because the islands involved have both had secondary invasions of mainland taxa without any evidence of intergradation. It is our contention that secondary invasions are not necessary to show that many of these island forms should be treated as distinct species. If one maps all the forms of *Spilornis* and categorises them simply as 'large', 'medium-sized' and 'small', and 'dark', 'intermediate' and 'pale', one finds that those on neighbouring island groups are often so different that it is hard to believe that interbreeding would take place naturally if they were brought together.

For example, there are four different forms on the island groups off the west coast of Sumatra, even though these islands are only 50-120 km from each other and all are no farther from Sumatra: from north to south, the medium dark *abbotti* on Simeulue, the small pale *asturinus* on Nias, the medium pale *batu* on Batu (this being an undisputed race of *cheela* also found in southern Sumatra) and the small dark *sipora* on the Mentawai group of Siberut and Sipora. Northern Sumatra has another medium-sized and somewhat intermediately coloured race of *cheela* that also extends north to south Burma. It is difficult to believe that either of the Sumatran races would interbreed with any of the three distinct island forms were a secondary colonisation to occur.

Little is known of variations in behaviour and calls among these forms, but the montane Bornean *kinabaluensis* has 'its vocalizations...quite different from those of the much smaller *Spilornis cheela pallidus* of the Bornean lowlands' (B King in Amadon & Bull 1988).

When one plots the extraordinary variations in size and colour of all the *Spilornis* group, showing that small island forms are often interspersed with larger ones, and pale with dark, we believe that this group must logically be treated as involving at least the 12 species shown on plates 26–27, even though this means setting up as species (as Amadon was reluctant to do) seven or eight forms previously treated as subspecies. The remaining 14 forms are here still considered races of *S. cheela*; some also appear on plate 26.

Raptors are not often artificially introduced to islands, but other bird groups are. It may be pertinent to take one example to illustrate how the lumping of long-isolated island forms with widespread continental species may be unwise. The Mauritius Parakeet *Psittacula eques* was for a considerable period considered a race of the widespread Rose-ringed (Ring-necked) *P. krameri*, but, when the latter was (most regrettably) introduced to Mauritius, there was no interbreeding; indeed, the two proved quite different in their behaviour and ecology (CG Jones in Diamond 1987). The Mauritius bird is now considered more likely to have evolved from ancestral stock of the southeast Asian Alexandrine Parakeet *P. eupatria*.

#### **'Novae-hollandiae' accipiters**

The Australasian group of accipiters that make up the 'novae-hollandiae' complex, comprising 28 forms of which many are confined to small islands, is almost more difficult than *Spilornis*. It relates to populations from the Moluccas and Lesser Sundas east through New Guinea to the Solomons and south through north and east Australia to Tasmania.

Brown & Amadon (1968) treated them as just two species, separating the three Grey-throated forms of the Moluccas from the rest as *Accipiter griseogularis*. Wattle (1973) and Amadon & Bull (1988) combined all in the one species, the Grey *A. novae-hollandiae*. In between, Stresemann & Amadon (1979) considered the island forms 'dubiously conspecific' with the Australian *novae-hollandiae*.

Wattle pointed out that it is only the existence of leucistic variants in both *novae-hollandiae* of Australia and *leucosomus* of New Guinea that has kept most authors from separating all the island forms from *novae-hollandiae* (see also Mayr 1940, Condon & Amadon 1954); but the leucistic birds may be nothing more than a local mimetic adaptation to the presence of the white Sulphur-crested Cockatoos *Cacatua galerita* (C. Edelstam in Campbell & Lack 1985).

In our view, the much larger size of the Grey Goshawk *A. novae-hollandiae* of Australia, and its lack of rufous, render the specific separation of the island complex of forms which make up the Varied Goshawk *A. hiogaster* (including *leucosomus*) more logical. Schodde (1977) also argued this on the abruptness of the differences between the populations of north Australia (Cape York) and adjacent southern New Guinea, periodically joined during the Pleistocene, without 'any hint of intergradation'.

We also follow Brown & Amadon in splitting off the Moluccan races as Grey-throated Goshawk *A. griseogularis*. As with *Spilornis*, some of the endemic island forms of the Varied Goshawk complex (*hiogaster*) differ so markedly from their neighbours that there could well be a case for further division at the species level. We also treat the Christmas Island *natalis* as belonging with *hiogaster* and not, as is more usual, as a race of the Brown Goshawk *A. fasciatus*; indeed, it may be a distinct species itself.

#### **Other island raptors**

Two other isolated island raptors are here raised to species level. The Cape Verde Kite *Milvus fasciicauda* shows characters of both Red Kite *M. milvus* and Black Kite *M. migrans*, and some intermediate ones; it has variously been combined with one or the other (usually with *M. milvus*) and also been suggested as a hybrid (de Naurois 1972). It has evidently interbred with the Black Kite, which until recently (when populations of both taxa have plummeted to probable extinction there) was spreading in the Cape Verde Islands and on most islands had replaced it, but in all the circumstances *fasciicauda* seems logically best treated as a species.

The Juan Fernandez Hawk *Buteo exsul* is endemic to Isla Alejandro Selkirk (formerly Más Afuera), the more distant from the South American mainland of this two-island group, though some have now been introduced to Isla Robinson Crusoe (formerly Más A Tierra). Its isolation and lack of the marked sexual plumage differences of its mainland congener, the Red-backed Hawk *B. polyasoma*, justify its distinction at the species level; this is another of Stresemann & Amadon's 'megasubspecies'.

#### **Spanish Imperial Eagle and further possible species**

The Spanish form, *adalberti*, of the Imperial Eagle *Aquila heliaca* has recently been strongly proposed as a distinct species (Hiraldo *et al.* 1976 and, especially, González *et al.* 1989c). The adult has more white on the shoulders, clearer white 'braces' and often less buff on the head; the juvenile is much paler, more rufous and less streaked. We carefully considered this even before González *et al.* put forward their full case, which is based on indications that Imperial Eagles breeding in northeast Spain, south France and Algeria in the 19th century were typical *heliaca* and that there was no intergradation; and on 'molecular data and substantial differences in morphology and ecology' (del Hoyo *et al.* 1994). The evidence appears to us inconclusive, however, and we still see no reason to alter our view that it is more proper to consider

the Spanish Imperial Eagle as a subspecies; rather, it appears to us that the European ranges of both forms have been, and are, withdrawing slowly from earlier contact and that any 19th-century records of breeding or even occurrence in the intermediate zone were casual and mostly indeterminate or unreliable. Parker (1990) advanced more detailed arguments against species status. Perhaps the strongest case for treating *adalberti* as a distinct species would be on conservation grounds: it is certainly an endangered taxon which might then receive even more urgent support, but that in itself is not a valid reason.

Because of the view we have taken, it has been put to us that Beaudouin's Snake-eagle (but not the Black-chested, p. 72 above) and Madagascar Gymnogene *Polyboroides radiatus* should be treated as conspecific with, respectively, Short-toed Snake-eagle and African Gymnogene *P. typus*, since there, too, it is the juveniles that are the more different. In those cases, however, geographical isolation is much older, there are greater differences in the proportions of the adults, and the juvenile distinctions are more marked.

The only additional species set out by Amadon & Bull (1988) but not accepted here concerns the separation of the Eastern Marsh Harrier (p. 72 above). They did, however, mention several other possibilities and, of these, the following were raised to full species by Sibley & Monroe (1990), the taxa with which we have considered them conspecific being named in brackets:

1. Black-eared Kite *Milvus lineatus* (Black Kite *M. migrans*)
2. Red-chested Goshawk *Accipiter toussenellii* (African Goshawk *A. tachiro*)
3. White-breasted *Accipiter chionogaster*, Plain-breasted *A. ventralis* and Rufous-thighed Hawks *A. erythronemius* (all Sharp-shinned Hawk *A. striatus*)
4. Grey Hawk *Asturina* (*Buteo*) *plagiata* (Grey-lined Hawk *B. nitidus*)
5. Archer's Buzzard *Buteo archeri* (Augur Buzzard *B. augur*)
6. Indian Tawny Eagle *Aquila vindhiana* (Tawny Eagle *A. rapax*)

For several of these, however, there seems little evidence of reproductive isolation and differences appear to be clinal (1, 2, 4); or geographical isolation is long established, but differences are very small (6).

On the other hand, there may now be reasonable grounds for treating the Central American White-breasted, the Andean Plain-breasted and the eastern South American Rufous-thighed Hawks (3) as three separate species of accipiter distinct from their northern counterpart, the Sharp-shinned Hawk. Similarly, Archer's Buzzard (5) is both isolated and different enough to be seriously considered as a separate species. Were we to be drawing up the world list now, we would probably treat these four taxa as full species.

Another African buzzard complex which may involve two species concerns the Mountain Buzzard *B. oreophilus*; this has a patchy distribution in strictly montane East Africa with little variation, and then a distinctive isolated population *trizonatus* in mainly lowland South Africa, where it is known as the Forest Buzzard.

The above possible candidates for treatment at the specific level, and some others which we consider less deserving, are highlighted in the species list on pp. 6–13. These examples all serve to emphasise that full agreement can never be reached in marginal or problem cases, because the existence of a range of intermediate stages is implicit in the concept of evolution. It comes down to the fine line between thinking of one geographically isolated form as a 'megasubspecies' or of treating it as forming a superspecies with its closest relatives.

## SUBSPECIES

In general, we have made only limited researches to assess the validity of subspecies. For the most part, those named in the caption texts and, more completely, under 'Geographical Variation' in the main texts currently have widespread acceptance.

Subspecies, or races, bear a trinomial scientific name, the generic and specific names being followed by a third or subspecific name. Within all the species texts here, the third name is frequently used on its own or, in the case of the 'nominotypical' race, the subspecies that includes the type of the species, is replaced by the older but shorter and simpler equivalent word 'n nominate'.

# ENGLISH NAMES OF RAPTORS

Even disregarding local names, a single species may be known formally at national levels by several different English alternatives in various parts of a wide range.

Although there is now almost universal agreement to adopt Black Kite *Milvus migrans* for what is arguably the most numerous raptor in the world, a variety of names was long used for different races. These included 'Yellow-billed Kite' in Africa; 'Pariah Kite', 'Black-eared Kite', 'Large Indian Kite' and other, ruder, names in India; and, until relatively recently, 'Fork-tailed Kite' in Australia. The last is a suitable differentiation from the same country's endemic Square-tailed Kite *Lophoictinia isura*, but in world terms inappropriate by comparison with several more deeply fork-tailed species, not least the congeneric Red Kite *M. milvus* of the West Palearctic.

If we take the kestrel group as further examples, *Falco tinnunculus* is variously 'Common Kestrel' in Europe, 'Eurasian Kestrel' as a vagrant in North America, 'Rock Kestrel' in South Africa and, reflecting different races, 'European Kestrel', 'Indian Kestrel' and 'East Himalayan Kestrel' in India. In the UK it has long been known simply as 'Kestrel', which in turn makes it difficult to discuss in relation to other kestrels. The closely related species of the Moluccas, *F. moluccensis*, is known as either 'Spotted Kestrel' or 'Moluccan Kestrel' and its replacement in New Guinea and Australia, *F. cenchroides*, as 'Australian Kestrel' or, formerly, 'Nankeen Kestrel'.

Conversely, one name is sometimes applied to different species in different parts of the world. Thus, 'Spotted Kestrel' has been used not only for *F. moluccensis*, but also for *F. newtoni* of Madagascar, where another species is the 'Barted (or Banded) Kestrel' *F. zoniventris*. (At least the American Kestrel *F. sparverius* is no longer called 'Sparrow-Hawk'.) 'Swallow-tailed Kite' is used for *Elanoides forficatus* in the Americas and for *Chelictinia tincouri* in Africa. 'Black Eagle' is the name for *Aquila verreauxii* in South Africa, but for *Ictinaetus malayensis* from India eastwards. Most confusing of all, 'Black Vulture' is *Coragyps atratus* in the New World, but long used for *Argypius monachus* in the Palearctic and for *Argypius (Sarcogyps) calvus* in India. The last is also sometimes called 'King Vulture', but that is the only English name for *Sarcoramphus papa* of Central and South America.

At a generic level, most Old World species of *Accipiter* bear the name 'Goshawk' or 'Sparrowhawk', but all in the New World – apart from the standardised 'Northern Goshawk' for *A. gentilis* and, uniquely and therefore illogically, 'Grey-bellied Goshawk' for one of several South American species, *A. poliogaster* – normally have just the word 'Hawk' as the generic term. Furthermore, 'Hawk' is also applied in the Americas to all species of *Buteo*, whereas in the Old World these all bear the name 'Buzzard'. 'Buzzard' in America was formerly the Turkey Vulture *Cathartes aura*, and in Australia, where *Buteo* is absent, it is still applied to the Black-breasted Kite *Hamirostra melanosternon*. The species of the genus *Aviceda* are called 'Bazas' in southeast Asia, and now also in Australia, where the one species, *A. suberistata*, was for a considerable time known as 'Crested Hawk' (now 'Pacific Baza'); but in India they are often 'Lizard-hawk' (reflecting food) and in Africa 'Cuckoo-hawk' (reflecting pattern) or even 'Cuckoo-Falcon'. And so on.

## RATIONALISATION OF ENGLISH NAMES

In 1988, the British Ornithologists' Union Records Committee and *British Birds* began attempting (so far with rather less than total success or approval) to revise the English names of West Palearctic bird species for use in British publications. Apart from making reference to inappropriate descriptive names and the advantages of simplification, the BOURC's main objectives might be condensed as:

1. Unrelated species should never have a common group name which would result in their being indexed together.
2. All species within a natural group...should preferably have a distinctive name under which they would be indexed together.
3. Each species...should have a unique name (i.e. one not shared with another species or with a group)...ideally on a world scale.
4. When possible, names should accord with those adopted in other countries (particularly where the species is commoner)....

Subsequently, on the initiative of various British and American ornithologists, including the late Burt L Monroe Jr, who had wrestled with this problem in compiling one of the major world lists (Sibley & Monroe 1990), a committee was set up to make recommendations for universal standardisation at the International Ornithological Congresses of 1994 in Vienna, Austria, and of 1998 in Durban, South Africa. Although some progress has been made, it seems that the completion of a standard list of recommended names for all the world's bird species, with full rationalisation, is still some way off – and there is no guarantee that it

will be universally accepted when it does appear. (In this context, it is worth noting that a standardised world list of French names of birds was produced as long ago as 1993, by the Commission internationale des noms français des oiseaux.)

In deciding what English name to use in this book for each of the world's raptors, we have borne in mind the original aims of the BOURC and agree with most of its adopted usage for this group of birds as published in *The British List* (1998), apart from a dislike of the awkward 'Eurasian' – which can often be better replaced by, say, 'Northern' (e.g. 'Northern Sparrowhawk', 'Northern Hobby') – and 'White-tailed Eagle', which violates point 1 of its objectives as condensed above [see next section]. Below, we attempt to justify our decisions where they depart from other practices.

### **'BUZZARDS', 'EAGLES', AND 'FALCONS'**

Remembering points 1 and 2 of the BOURC's aims as outlined above, not so much for the question of indexing as to avoid suggesting incorrectly close affinities, we have adopted the convention of using a hyphen, followed by a lower-case letter, where the last word of the English name is misleading. Thus, as the BOURC has done for the one British species, we have hyphenated 'Honey-buzzard' for all *Pernis* and *Hemicopernis*, to differentiate these, which belong to the kite group, from the totally unrelated true buzzards of the genus *Buteo*.

A corresponding situation arises from the word 'Eagle', which has long been applied to raptors of eight genera that are quite unrelated to the true eagles. Therefore, we have used 'Fish-eagle' (in preference to the less universally appropriate 'Sea-eagle') for all species of the genus *Haliaeetus* – apart from the Bald Eagle *H. leucocephalus*, the name of which is too well established as that of USA's national bird – and, similarly, 'Fishing-eagle' for the two *Ichthyophaga*; these two genera are close in taxonomic terms to the Old World vultures and, more especially, the kites, but not at all to the typical eagles. Likewise, we have used 'Snake-eagle' and 'Serpent-eagle' for all *Circus* and *Spilornis* respectively, again to emphasise that they belong to a quite different group.

Three species in two South American genera which have hitherto generally been called 'Eagles' are actually buteonines or large buzzard-types: the first, *Geranoaetus melanoleucus*, usually known as 'Black-chested Buzzard Eagle', has here been switched to 'Black-chested Eagle-buzzard', and we have hyphenated the two *Harpyhaliaeetus* as Black and Crowned 'Solitary-eagles'. But 'Eagle' has been retained for the more typical harpy eagles (though they have bare tarsi) and the true or booted eagles (with feathered tarsi) from the genus *Morphnus* through, among others, *Aquila*, *Hieraetus* and *Spizaetus* to *Polemaetus*. The booted group still includes *Ictinaetus* ('Indian Black Eagle') even though it has been suggested that this may be a large and highly specialised kite ['Taxonomy, sequence and nomenclature of raptors', p. 69–75].

On the other hand, while many species in the genera *Hieraetus* and *Spizaetus* have long been called 'Hawk Eagles', we have not attempted to standardise these (which would involve, for example, 'Booted Hawk Eagle' for *H. pennatus*), nor to hyphenate them as 'Hawk-Eagles', because they are all still true eagles close to *Aquila*, while simply to drop the word 'Hawk' from the names of some of these eagles would result in further confusions.

To differentiate the 'falcons' of the more primitive South American genera of *Herpetotheres* and *Micrastur* from typical *Falco*, we have hyphenated the former as 'Laughing-falcon' and 'Forest-falcon' respectively. We have also linked the two *Polihierax* as 'Pygmy-falcons', but have left both *Spizaapteryx* and *Microhierax* as 'Falconets': they used to be placed in the same subfamily, even though the South American Spot-winged Falconet *S. circumcinctus* is much larger than any of the five Indomalayan *Microhierax* (the smallest raptors of all) and is now regarded as closer to the other primitive South American Falconiformes (Olson 1976).

### **'VULTURES', 'HAWKS', AND OTHERS**

We have made no attempt to rationalise either 'Vultures' (apart from discarding 'Griffons' as a generic term often applied to many, but not all, of the genus *Gyps*) or the American 'Hawks'.

New World and Old World vultures are unrelated, belonging to quite different orders – indeed, the American vultures and condors are now known to be highly adapted storks (Ciconiidae) rather than allied to the other families treated in this book ['Taxonomy, sequence and nomenclature of raptors', pp. 69–75] – but we have retained 'Vulture' for both. At least, this word demonstrates the convergence of their characters of size, superficial shape, mostly bare head sometimes edged with a ruff, social behaviour, carrion-eating, and very limited or non-existent sexual size dimorphism ['Sexes and age differences in sizes and shapes of raptors', pp. 35–39]. The two largest American cathartids, *Gymnogyps* and *Vultur*, remain 'Condors'. The only Old World vulture which does not usually include the generic term in its English name is the atypical Lammergeier *Gypaetus barbatus* of Eurasia and Africa. Although 'Lammergeier' is both Dutch and German for 'Lamb's Vulture' (strictly, Lämmergeier in German, Lammergier in Dutch), which gives a totally wrong impression of the food spectrum of this magnificent scavenger of bones, we

have retained that name, rather than using the alternative 'Bearded Vulture': there is still disagreement over whether the species can be regarded as a vulture at all [see 'Taxonomy, sequence and nomenclature of raptors', pp. 69–75].

We have placed a hyphen before the word 'hawk' for 'Cuckoo-hawks' and 'Bat-hawk' *Macheiramphus alcinus*, both classed as atypical kites [but see 'Raptor moult patterns and age criteria, pp. 50–53]; for the 'Harrier-hawks' (although choosing to use the alternative 'Gymnogone' as the English name at the species level); and for the 'Crane-hawk' *Geranospiza caerulescens* ['Taxonomy, sequence and nomenclature of raptors', pp. 69–75] – all in an effort to confine the use of 'Hawk' on its own to the accipitrine and buteonine groups, especially the typical *Accipiter* and *Buteo*.

Courage has failed us over any attempt to standardise these last two genera (two of the largest three in world terms) so far as the Americas are concerned. In the Old World, all *Accipiter* species, except for the Shikra *A. badius* and the Besra *A. virgatus* (names of Urdu and Hindi origin respectively), include either 'Goshawk' or 'Sparrowhawk' as a generic term: the difference between those terms is made mainly on the basis of the foot formations of strength and length of tarsi and, particularly, toes (not, as is often assumed, solely on body size although this, together with accepted usage, has been taken into account for certain species which are neither big and short-toed nor small and long-toed). At the same time, all *Buteo* species in the Old World are 'Buzzards' (including the Holarctic Rough-legged Buzzard *B. lagopus*, which is called 'Rough-legged Hawk' in North America). Perhaps the Americas will eventually follow suit, as they did, not so very long ago, with their species in the third of the largest three genera, *Falco*: it seems surprising now that, until the 1950s, the Peregrine Falcon *F. peregrinus* was often still called 'Duck Hawk' and the Merlin *F. columbarius* 'Pigeon Hawk'.

Turning to small genera, we have hyphenated 'Chanting-goshawk' for all *Melierax* to differentiate them from the true 'Goshawks'; we might also have removed the 'gos', but the name as it stands has a certain ring to it. Now that it, too, is no longer regarded as accipitrine, there has been a similar tendency to separate the New Guinea *Megatriorchis doriae* by using the name 'Doria's Hawk' without the 'Gos'; we have followed this, and taken it a step further by dropping 'Gos' from 'Red Hawk' for the Australian *Erythrotriorchis radiatus* and from 'Bürgers's Hawk' for the now evidently congeneric *E. buergeri* of New Guinea, neither of which is typical of the accipiters which form the goshawk/sparrowhawk group. Nor are the four species of *Butastur* in any way typical of the buteos, even though they have hitherto been known universally as 'Buzzards': we could perhaps have called them 'Hawks', but they do not sit easily with other species so termed and, indeed, are in some ways intermediate between the accipiters and the buteos; hence, we have preferred to coin the new name 'Buzzard-hawk', which seems rather appropriate and also has the advantage of retaining the more familiar name as part of it.

## EPONYMOUS NATURALISTS

The above-named Bürgers's Hawk illustrates another point. An increasing trend in recent years, particularly in the tropics, has been to discard eponymous names for others which describe some feature of the species. In New Guinea lists, Dr Bürgers's hawk has now tended to give way to 'Chestnut-shouldered' (and, incidentally, been called 'Goshawk', presumably because of its size, whereas, were it an accipiter, its relatively slender tarsi and long toes would make it a 'Sparrowhawk').

This discarding of the familiar names of past ornithologists and naturalists (or their wives and friends), such as Jerdon, Pallas, Steller, Rüppell, Montagu, Cooper, Ridgway, Swainson, Gurney, Verreaux, Bonelli, Ayres, Cassin, Blyth and, not least, Darwin himself, seems sad to us. We have retained all these, as well as Forbes, Sanford, Braudouin, Gundlach, Henst, Meyer, Bürgers, Wahlberg, Wallace, Isidor, Forster, Buckley, Dickinson and, of course, Doria, Frances (not France's, for *Accipiter francesii*) and Eleonora. How much more distinctive and evocative is 'Isidor's Eagle' than 'Black-and-chestnut Eagle', when there are others in South America with black and chestnut in their plumage.

We have two exceptions to this policy. First, we have preferred 'Moluccan Goshawk' to 'Gray's Goshawk' for *Accipiter henicogrammus*, because of the possibility of confusing the latter with 'Grey Goshawk' *A. novae-hollandiae*, 'Grey-throated Goshawk' *A. griseogularis* and 'Grey-headed Goshawk' *A. poliocephalus*, all of which occur also in the Australasian region. Second, we have preferred 'Malagasy Spotted' to 'Newton's Kestrel' for *Falco newtoni* (see next paragraph).

## OTHER EXAMPLES AT THE SPECIES LEVEL

Continuing with specific names and looking first at the confusions in the opening paragraphs, 'Common Kestrel' seems most suitable for *F. tinnunculus* and 'Moluccan Kestrel' for the closely related *F. moluccensis*, leaving 'Malagasy Spotted' and 'Madagascar Barred' for the endemic Malagasy pair of *F. newtoni* and *F. zosterivris*.

'Swallow-tailed Kite' is retained for the American *Elanoides forficatus*, and the sometimes already favoured

'Scissor-tailed Kite' is applied to the smaller and less spectacularly streamered *Chelictinia vocouiti* of Africa. 'Verreaux's Eagle' is used for *Aquila verreauxii*, leaving 'Indian Black Eagle' for *Ictinaetus malayensis*. 'Black Vulture' is now applied to the American *Coragyps atratus* alone: the southeast Asiatic *Argyrops colinus* becomes 'Red-headed Vulture', an already well-established alternative, and the Palearctic *Argyrops monachus* is given the recently coined but increasingly accepted name 'Monk Vulture' (also the equivalent of the Dutch and German names) in preference to the more usual alternative of 'Cinereous Vulture' (it is no more ashy-grey than it is black).

'Banded Snake-eagle' has previously been applied to both *Circus cinerascens* and the far more local *C. fasciolatus*, often confusingly qualified by 'Smaller' and 'Southern' respectively, but the 'Smaller' averages longer-winged and looks smaller only because of its shorter tail, while the range of the 'Southern' is mostly farther east and coastal; as *C. cinerascens* has the obvious tail-band, we think it more helpful to call this 'Banded Snake-eagle' and use 'East African Snake-eagle' for *C. fasciolatus*. Also in Africa, we prefer 'Great Sparrowhawk' to 'Black Sparrowhawk' for *Accipiter melanoleucus* because there are a number of melanistic accipiters and, as the scientific name here indicates, this species is actually black and white. Among *Accipiter*, we have retained 'Baza' for the Indo-Australasian species and 'Cuckoo-hawk' for the Afro-Malagasy species. We have also preferred the Australasian 'Pacific Baza' to the more translatable 'Crested Baza' for *A. suberistata*, because all bazas are crested to some extent.

Some other examples of changes should be mentioned. 'Australasian Marsh Harrier' is preferred to 'Swamp Harrier' for *Circus approximans*, and Malagasy Marsh Harrier is preferred to 'Réunion Harrier' for *C. maillardi*, to relate them more clearly to the remainder of this superspecies. Following a recent trend, we also use 'Greater Spotted Eagle' for *Aquila clanga* to distinguish it from 'Lesser Spotted Eagle' *A. pomarina*.

Among the Falconiformes, it is tempting at first sight to have 'Yellow-throated Caracara' for *Daptrius ater* and 'White-throated Caracara' for *Phalcoboenus albogularis*, to correspond with the Red-throated *D. americanus*, but we have followed current practice with 'Black Caracara' in the first case and prefer 'Darwin's Caracara' in the second, not only because of the eponym but also because the adult is actually wholly white below (not just on the throat). 'White-fronted Falconet' is preferred to 'Bornean' for the endemic *Microhierax latifrons* of Sabah, because there is another falconet in Borneo. We also use 'White-eyed Kestrel' in preference to 'Greater Kestrel' for *Falco rupicoloides* because that species is not particularly large and the white eyes are diagnostic; and 'Eastern Red-footed Falcon' instead of the admittedly much simpler 'Amur Falcon' for *F. amurensis* to maintain the link with the other half of this species pair, the Western Red-footed *F. vesperinus*. Similarly, 'Australian Hobby' replaces 'Little Falcon' for *F. longipennis*, to complete the hobby quartet, even though it has recently been proposed that any resemblance is the result of convergence ['Taxonomy, sequence and nomenclature of raptors', pp. 69-75].

Finally, where islands or countries have altered their names, we have usually adopted the new name or spelling: thus, for example, 'Sulawesi (not Celebes) Hawk Eagle' for *Spizaetus lanceolatus*. In some instances, however, where the older name is still widely used, we have retained that: so we have 'Ryukyu (not Nansei) Serpent-eagle' for *Spilornis perplexus*.

Certain of these decisions may seem to ride roughshod over some at national levels. If that be the case, we apologise but hope that our actions will be seen as attempted steps towards rationalisation. All main old or alternative names are given under the headings of the species texts (including some which may perhaps emerge as preferences in future, such as 'Savannah' and 'Forest' for the two yellow-headed vultures *Cathartes burrovianus* and *C. melambrotus* of South America).

Critics may say that the scientific names are there to show affinities between and among species, so that English names are relatively unimportant, but English-speaking birdwatchers on both sides of the Atlantic, like English-speaking people in general, tend to be ill at ease when not using their own tongue. We therefore feel that, for practical reasons, there is some merit in attempting to standardise vernacular names in a more rational way than has been done before.

## PLATE 1: KEY TO GENERA OF MAINLY LARGER RAPTORS (Scale: c1:40)

Examples shown (named in brackets after name of genus) are all adult ♂s. While most ♀s are bigger (especially FG|JKNTX, also HLMVWY) and a few just smaller (CDEZ), proportions below relate to adults in general. But some juveniles have tails clearly longer (FKN) or shorter (Z); others have wings broader (e.g. KLNO) or longer (K). Regions: Afrotropical, Australasian, Cosmopolitan, Indomalayan, Malagasy, Nearctic, Neotropical, Palearctic [bracketed if marginal]. Scale silhouettes: Swainson's Hawk, Black Kite.

### Genera confined to New World

- A** *CORAGYPS* (Black Vulture) Smallish stocky black vulture: thin bill, bare grey head (juv black), broad wings with white near tips below, short squared tail: L56–74 cm, S133–160 cm. **Nea/Neo 1: plate 4.**
- B** *CATHARTES* (Turkey Vulture) Slender blackish vultures: bare red or yellow/blue heads (juvs dusky), long 2-tone wings, longish rounded tails: L53–76 cm, S150–182 cm. **Nea/Neo 2–4: plate 4.**
- C** *GYMNOGYPS* (California Condor) Huge black vulture: heavy bare orange head (juv dusky), long broad wings marked with white, shortish squared tail: L109–127 cm, S249–300 cm. [**Nea**] **5: plate 5.**
- D** *VULTUR* (Andean Condor) Huge black vulture with white ruff/wing-patches (juv all-brown): bare purplish head (♂ big comb), long broad wings, longish tail: L100–122 cm, S272–310 cm. **Neo 6: plate 5.**
- E** *SARCORAMPHUS* (King Vulture) Mid-sized white and black vulture (juv brown): bare multicoloured head (juv dusky), very broad wings, shortish squared tail: L71–81 cm, S170–200 cm. **Neo 7: plate 5.**
- F** *GERANOÆTUS* (Eagle-buzzard) Slate and white or barred eagle-sized buteonine (juv browner, streaky): rather pointed wings, short wedged tail: L60–76 cm, S145–180 cm. **Neo 182: plate 58.**
- G** *HARPYHALIAÆTUS* (Crowned Solitary-eagle) Ashy or slate eagle-sized buteonines (juvs browner, streaky): long broad wings, medium or short tail: L60–73 cm, S155–180 cm. [**Nea**]/**Neo 183–184: plate 58.**
- H** *MORPHNUS* (Crested Eagle) Large polymorphic eagle (juv more whitish): longish erectile crest, short rounded wings, bulging secondaries, long rounded tail: L71–89 cm, S140–160 cm. **Neo 213: plate 72.**
- I** *HARPIA* (Harpy Eagle) Huge slate, white and grey eagle (juv whiter): forked crest, short rounded wings, bulging secondaries, longish tail: L89–100 cm, S180–200 cm. **Neo 214: plate 72.**
- J** *OROAÆTUS* (Isidor's Eagle) Large black, chestnut and grey eagle (juv more whitish): pointed crest, broad wings, bulging secondaries, longish tail: L63–74 cm, S155–175 cm. **Neo 247: plate 72.**

### Genera common to New and Old Worlds

- K** *HALIAÆTUS* (x Bald Eagle, v Steller's Fish-eagle, z African Fish-eagle) Large dark fish-eagles, most partly white (juvs complex): long broad wings, rounded/wedged tails: L60–105 cm, S165–244 cm. **Cos except Neo 42–49: plates 15–18.**
- L** *AQUILA* (x Golden Eagle, v Wedge-tailed Eagle) Large tawny to black eagles (juvs often paler): very important to note wing-tail shapes: L60–104 cm, S145–235 cm. **Cos except Neo/Mal 218–236: plates 78–82.**
- M** *SPIZAÆTUS* (Changeable Hawk Eagle) Small to largish varicoloured eagles (juvs whiter): short rounded wings, longish tails: L45–84 cm, S95–175 cm. **Neo/Pal/Afr/Ind/[Aus] 236–245: plates 73, 75–77, 84.**

### Genera confined to Old World

- N** *ICHTHYOPHAGA* (Grey-headed Fishing-eagle) Smaller grey-brown and white fishing-eagles (juvs browner): broad rounded wings, rounded dark or 2-tone tail: L53–77 cm, S120–175 cm. **Ind/[Aus] 50–51: plate 18.**
- O** *GYPÆTUS* (Lammergeier) Very large blackish and orange vulture (juv brown): feathered head, tapering wings, long diamond-shaped tail: L94–120 cm, S225–287 cm. **Pal/Afr/[Ind] 53: plate 19.**
- P** *NECROSURTES* (Hooded Vulture) Smallish dark brown vulture: thin bill, bare red head (juv duller), broad rounded wings, short rounded tail: L57–68 cm, S150–180 cm. **Afr 55: plate 19.**
- Q** *GYPs* (Griffon Vulture) Largish to large tawny to blackish vultures with pale ruffs (juvs darker): downy heads, long broad wings, short tails: L75–110 cm, S185–285 cm. **Pal/Afr/Ind 56–62: plates 20–22.**
- R** *AEGYPIUS* (Monk Vulture) Large all-dark vultures (except smaller 65 with much white): bare/downy heads, long broad wings, short tails: L72–120 cm, S200–295 cm. **Pal/Afr/Ind 63–66: plates 20–21, 23.**
- S** *CIRCAÆTUS* (Short-toed Snake-eagle) Small to largish brown or pied snake-eagles (juvs vary): large heads, long broadish wings, longish tails: L54–78 cm, S120–198 cm. **Pal/Afr/Ind 67–72: plates 24–25.**
- T** *HARPYOPSIS* (New Guinea Eagle) Large brown and white eagle (juv similar but paler): rounded crest, short rounded wings, long rounded tail: L72–90 cm, S120–160 cm. **Aus 215: plate 74.**
- U** *PITHECOPHAGA* (Philippine Eagle) Huge brown and white eagle (juv similar): shaggy head, short rounded wings, longish squared tail: L86–96 cm, S180–200 cm. **Ind 216: plate 74.**
- V** *ICTINAÆTUS* (Indian Black Eagle) Largish slim black-brown eagle (juv tawny below and streaked): long paddle wings, longish tail: L65–80 cm, S160–185 cm. **Ind/[Aus] 217: plate 74.**
- W** *HIERAÆTUS* (x African Hawk Eagle, v Booted Eagle) Small to largish slender varicoloured eagles (juvs also vary): longish wings and tails: L40–74 cm, S102–179 cm. **Pal/Afr/Ind/Aus 227–233: plates 76, 78, 82–84.**
- X** *STEPHANOÆTUS* (Crowned Hawk Eagle) Very large blackish and blotched eagle (juv whitish): rounded crest, shortish rounded wings, longish tail: L80–95 cm, S150–180 cm. **Afr 246: plate 85.**
- Y** *POLEMAÆTUS* (Martial Eagle) Very large brown and spotted eagle (juv whiter): broad head, short crest, long broad wings somewhat pointed, shortish tail: L78–96 cm, S190–240 cm. **Afr 248: plate 85.**
- Z** *SAGITTARIUS* (Secretarybird) Very large, grey and black, terrestrial: crest, red face (juv yellow), long neck/legs, broad wings, elongated central tail: L112–150 cm, S200–225 cm. **Afr 249: plate 85.**



## PLATE 2: KEY TO GENERA OF MEDIUM-SIZED RAPTORS (Scale: c1:25)

Examples shown (named in brackets after name of genus) are mostly adult ♂s. While many ♀s are bigger (especially FWX, some LM, also BCDEKNSVYZ), proportions below relate to adults in general. But some juveniles have tails clearly longer (R, most M, also BC) or shorter (AQY, also O); others wings narrower (e.g. BCM) or shorter (OQ). Regions: Afrotropical, Australasian, Cosmopolitan, Indomalayan, Malagasy, Nearctic, Neotropical, Palearctic [bracketed if marginal]. Scale silhouettes: Swainson's Hawk, Black Kite.

### Genera confined to New World

- A** *ELANOIDES* (Swallow-tailed Kite) Largish black and white kite (juv similar): most graceful, long pointed wings, long tail deeply forked: L52–62 cm, S119–136 cm. **Nea/Neo 21: plate 14.**
- B** *LEUCOPTERNIS* (x Plumbeous Hawk, y White Hawk) Small/mid-sized grey, white or pied buteonines (juvs similar): shortish rounded wings, mid-length tails: L31–58 cm, S55–130 cm. **Neo 165–174: plates 54–56.**
- C** *BUTEOGALLUS* (x Common Black Hawk, y Savannah Hawk) Mid-sized/large black/rufous buteonines (juvs browner): mostly broad wings, short tails (but see 179): L38–67 cm, S81–140 cm. **Nea/Neo 175–179: plates 57, 59.**
- D** *PARABUTEO* (Bay-winged Hawk) Mid-sized black and rufous buteonine (juv paler, streakier): longish paddle wings, longish rounded tail: L45–59 cm, S101–119 cm. **Nea/Neo 180: plate 59.**
- E** *BUSARELLUS* (Black-collared Hawk) Mid-sized rufous buteonine marked black and white (juv streakier): long broad wings, short broad tail: L47–58 cm, S115–140 cm. **Neo 181: plate 59.**
- F** *SPIZASTUR* (Black-and-white Eagle) Smallish pied eagle (juv similar): contrasted crest, somewhat tapering wings, longish squared tail: L51–61 cm, S110–140 cm. **Neo 234: plate 73.**
- G** *DAPTRIVUS* (Red-throated Caracara) Mid-sized to small black or pied arboreal caracaras (juvs similar): bare face red, yellow, long wings, tails: L42–59 cm, S90–125 cm. **Neo 250–251: plate 88.**
- H** *PHALCOBOENUS* (Mountain Caracara) Largish pied or blackish upland caracaras (juvs rufous/brown): bare face, wings more pointed, longish rounded tails: L48–62 cm, S110–130 cm. **Neo 252–255: plate 86.**
- I** *CARACARA* (Crested Caracara) Large pied caracara (juv browner): bare face orange-yellow, long rounded wings, longish rounded tail, long legs: L51–62 cm, S115–140 cm. [**Nea**]/Neo 256: **plate 87.**
- J** *MICRASTUR* (x Barred Forest-falcon, y Collared F-f) Mid-sized to large primitive falcons, secretive and polymorphic: short rounded wings, long/longish rounded tails: L30–60 cm, S45–85 cm. **Neo 261–266: plates 89–90.**

### Genera common to New and Old Worlds

- K** *PANDION* (Osprey) Mid-sized white and brown fish-eating eagle-like hawk (juv similar): long narrow-tipped wings looking gull-like, shortish tail: L50–66 cm, S127–174 cm. **Cos except Mal 8: plate 6.**
- L** *CIRCUS* (x Northern Marsh Harrier, y Montagu's = juv ♂s) Slender grey, brown and/or black hawks (ad ♀s and juvs similar): long narrow wings in V, longish tails: L39–61 cm, S90–155 cm. **Cos 91–103: plates 29–33.**
- M** *BUTEO* (x Roadside Hawk, y Common Buzzard, z Augur Buzzard) Small to mid-sized hawks: longish broad wings, short to mid-length tails: L28–67 cm, S65–165 cm. **Cos except Aus 185–212: plates 60–71.**

### Genera confined to Old World

- N** *HENICOPERNIS* (Long-tailed Honey-buzzard) Largish blackish, barred and streaked, or black, kites (juvs similar): long broad paddle wings, long rounded tail: L48–61 cm, S105–140 cm. **Aus 16–17: plate 10.**
- O** *PERNIS* (Western Honey-buzzard) Largish polymorphic kites (juvs also vary): protruding head, long wings pinched at base, longish tails: L50–65 cm, S110–155 cm. **Pal/Afr/Ind/[Aus] 18–20: plates 6, 10.**
- P** *GYPOHIERAX* (Palmnut Vulture) Small white and black fruit-eating vulture (juv dark): bare face red, shortish broad rounded wings, short rounded tail: L57–65 cm, S135–155 cm. **Afr 52: plate 16.**
- Q** *NEOPHRON* (Egyptian Vulture) Smallish white vulture (juv dark brown): thin bill, bare face yellow, long broadish wings, longish wedge tail: L38–70 cm, S146–175 cm. **Pal/Afr/Ind 54: plate 19.**
- R** *TERATHOPTUS* (Bateleur) Black, chestnut and white snake-eagle (juv brown): bare face red, very long pointed wings, bulging secondaries, shortest raptor tail: L55–70 cm, S160–190 cm. **Afr 73: plate 23.**
- S** *SPILORNIS* (Crested Serpent-eagle) Tiny to largish spangled brown snake-eagles (juvs whiter, streaky): rounded wings/tail boldly banded: L38–74 cm, S85–175 cm. **Ind 74–86: plates 26–27.**
- T** *DRYOTRIORCHIS* (West African Serpent-eagle) Mid-sized brown and white or blotched snake-eagle (juv paler, spottier): short rounded wings, long rounded tail: L54–60 cm, S90–105 cm. **Afr 87: plate 25.**
- U** *EUTRIORCHIS* (Madagascar Serpent-eagle) Accipiter-like grey-brown and barred snake-eagle (juv dark-banded/white-tipped above): short rounded wings, long rounded tail: L57–68 cm, S98–110 cm. **Mal 88: plate 28.**
- V** *POLYBOROIDES* (African Gymnogone/Harrier-hawk) Largish grey and barred hawks (juvs brown or partly rufous/white): long broad wings, longish tails: L51–68 cm, S120–155 cm. **Afr/Mal 89–90: plate 28.**
- W** *ERYTHROTRIORCHIS* (Red Hawk) Large accipitrines with rufous body or shoulders (juvs redder/less streaked): long broad rounded wings, longish tails: L43–61 cm, S95–136 cm. **Aus 155–156: plates 44, 48.**
- X** *MEGATRIORCHIS* (Doria's Hawk) Large streaked/barred black and buff accipitrine (juv whiter): short rounded wings, long rounded tail: L51–60 cm, S90–105 cm. **Aus 157: plate 44.**
- Y** *UROTRIORCHIS* (Long-tailed Hawk) White-rumped grey and chestnut accipitrine (juv brown and white or spotted): short rounded wings, very long graduated tail: L56–65 cm, S75–95 cm. **Afr 158: plate 52.**
- Z** *LOPHAETUS* (Long-crested Eagle) Smallish mainly black eagle (juv similar): long floppy crest, shortish rounded wings, longish tail: L50–59 cm, S115–135 cm. **Afr 235: plate 84.**



## PLATE 3: KEY TO GENERA OF MAINLY SMALLER RAPTORS (Scale: cl:18)

Examples shown (named in brackets after name of genus) are all adult ♂s. While most ♀s are bigger (notably L, many M, also ABCEGIJOSTUVX) or at least longer-tailed (e.g. NQRY), proportions below relate to adults in general. But some juveniles have tails longer still, or far shorter (P), or wings longer (some M) or shorter (KPS). Regions: Afrotropical, Australasian, Cosmopolitan, Indomalayan, Malagasy, Nearctic, Neotropical, Palearctic [bracketed if marginal]. Scale silhouettes: Swainson's Hawk, Black Kite.

### Genera confined to New World

- A** *LEPTODON* (Grey-headed Kite) Mid-sized black and white kite (polymorphic juv Grey-headed very variable): long broad paddle wings, longish rounded tails: L43–53 cm, S90–110 cm. **Neo 14–14a: plate 13.**
- B** *CHONDROHIERAX* (Hook-billed Kite) Mid-sized polymorphic kite (juv also very variable): long-hooked bill, paddle wings, longish rounded tail: L39–51 cm, S78–98 cm. [**Nea**]/**Neo 15: plate 12.**
- C** *GAMPSONYX* (Pearl Kite) Tiny black and white falcon-like kite with orange and rufous patches (juv similar): longish pointed wings, squared tail: L20–25 cm, S45–55 cm. **Neo 23: plate 14.**
- D** *ROSTRHAMUS* (Snail Kite) Mid-sized mainly dark kites (juvs similar or like ♀s): thin long-hooked bill, long paddle wings, squared or notched tail: L35–48 cm, S80–115 cm. [**Nea**]/**Neo 29–30: plate 12.**
- E** *HARPAGUS* (Double-toothed Kite) Small grey-black and pale grey or rufous kites (juvs browner, streaked): shortish rounded wings, longish rounded tails: L29–35 cm, S60–72 cm. **Neo 31–32: plate 14.**
- F** *ICTINIA* (Mississippi Kite) Small pale grey and blackish falcon-shaped kites (juvs brown, streaked): long pointed wings, squared or notched tails: L29–38 cm, S70–85 cm. **Nea/Neo 33–34: plate 13.**
- G** *GERANOSPIZA* (Crane-hawk) Mid-sized slim grey and barred hawk (juv streakier): shortish rounded wings, bulging secondaries, longish rounded tail, long legs: L38–54 cm, S70–110 cm. [**Nea**]/**Neo 164: plate 54.**
- H** *MILVAGO* (Yellow-headed Caracara) Small slim brown, or buff and blackish, caracaras (juvs similar or streaked): long rounded wings, longish tails: L37–46 cm, S80–100 cm. **Neo 257–258: plate 87.**
- I** *SPIZIAPTERYX* (Spot-winged Falconet) Small streaky grey-brown primitive falcon with white rump/belly (juv similar): round-tipped wings, long rounded tail: L26–30 cm, S45–55 cm. **Neo 259: plate 90.**
- J** *HERPETOTHERES* (Laughing-falcon) Mid-sized, dark brown and buff, primitive falcon (juv paler): large masked head, shortish rounded wings, longish rounded tail: L45–55 cm, S75–95 cm. [**Nea**]/**Neo 260: plate 88.**

### Genera common to New and Old Worlds

- K** *ELANUS* (Black-shouldered Kite) Small grey/white gull-like kites (juvs browner, mottled): black-marked pointed wings, short squared/notched tails: L31–43 cm, S77–102 cm. **Cos except Mal 24–27: plates 7, 11–12.**
- L** *ACCIPITER* (x Northern Goshawk, y Sharp-shinned Hawk, z Levant Sparrowhawk) Small, mid-sized hawks, often barred or rufous below (juvs browner, streaked): short rounded wings, long tails: L20–62 cm, S38–122 cm. **Cos 108–154: plates 35–51.**
- M** *FALCO* (x Oriental Hobby, y Common Kestrel, z Peregrine Falcon) Small to large falcons (juvs similar or streaked): pointed wings, short to longish tails: L21–61 cm, S40–150 cm. **Cos 274–312: plates 95–112.**

### Genera confined to Old World

- N** *AVICEDA* (x African Cuckoo-hawk, y Pacific Baza) Small/mid-sized kites often barred below (juvs browner): crest, long paddle wings, rounded tails: L28–49 cm, S64–105 cm. **Afr/Mal/Ind/Aus 9–13: plates 8–9.**
- O** *MACHEIRAMPUS* (Bat-hawk) Mid-sized black-brown falcon-like kite (juv browner): broad-based pointed wings, shortish tail, crepuscular: L41–51 cm, S95–120 cm. **Afr/Mal/Ind/[Aus] 22: plate 8.**
- P** *CHELICTINIA* (Scissor-tailed Kite) Small grey and white tern-like kite (juv browner): long pointed wings, long deep-forked tail (juv much shorter): L33–38 cm, S68–76 cm. **Afr 28: plate 8.**
- Q** *LOPHOICTINIA* (Square-tailed Kite) Largish slender brown and rufous kite (juv redder, less streaked): very long wings, longish notched tail: L50–56 cm, S131–146 cm. **Aus 35: plate 11.**
- R** *HAMIROSTRA* (Black-breasted Kite) Large stocky black and rufous kite (juv much paler, less black): longish broad wings, short broad squared tail: L51–61 cm, S141–156 cm. **Aus 36: plate 11.**
- S** *MILVUS* (Black Kite) Large dark brown or rufous kites (juvs similar): long and fairly broad wings, longish forked or triangular-looking tails: L46–68 cm, S120–171 cm. **Pal/Afr/Mal/Ind/Aus 37–39: plate 7.**
- T** *HALIASTUR* (Brahminy Kite) Large rufous and white, or brownish, kites (juvs streaky, or similar): broad rounded wings, medium-longish rounded or wedged tail: L44–59 cm, S110–146 cm. **Ind/Aus 40–41: plate 15.**
- U** *MELIERAX* (Dark Chanting-goshawk) Largish grey and barred accipitrine hawks (juvs brown and barred): broad rounded wings, longish graduated tails: L45–63 cm, S95–125 cm. **Afr/[Pal] 104–106: plate 34.**
- V** *MICRONISUS* (Gabar Goshawk) Small grey and barred accipitrine hawk with white rump, or all black (juv streaky brown and barred): rounded wings, long rounded tail: L29–36 cm, S55–65 cm. **Afr 107: plate 34.**
- W** *BUTASTUR* (White-eyed Buzzard-hawk) Mid-sized rufous-marked buteonines (juvs similar): rather pointed slender wings, longish tails: L35–48 cm, S80–110 cm. **Pal/Afr/Ind/Aus 159–162: plates 52–53.**
- X** *KAUPIFALCO* (Lizard-buzzard) Smallish grey and barred buteonine with white rump/tail-band (juv similar): longish wings somewhat pointed, mid-length tail: L30–37 cm, S65–80 cm. **Afr 163: plate 52.**
- Y** *POLIHIERAX* (African Pygmy-falcon) Small grey and white falcons, some chestnut on ♀s (juvs similar): short pointed wings, squared or graduated tail: L19–28 cm, S31–45 cm. **Afr/Ind 267–268: plate 91.**
- Z** *MICROHIERAX* (Collared Falconet) Tiny black and white falcons, some also with rufous (juvs similar): short pointed wings, longish rounded tails: L14–20 cm, S27–37 cm. **Ind 269–273: plates 91–92.**



## PLATE 4: SMALLER NEARCTIC AND NEOTROPICAL VULTURES

### 2 Turkey Vulture *Cathartes aura*

L62–76 cm (27 in): S160–182 cm (67 in): T22–29 cm (10 in): ♂97%

Open/forested areas, to 2,200 m (3,000 m). Slim vulture; long wings, longish tail, small wrinkly head. Deep flexible beats; glides/soars rocking on V wings. Often social. [cf. 1/3/4:199]

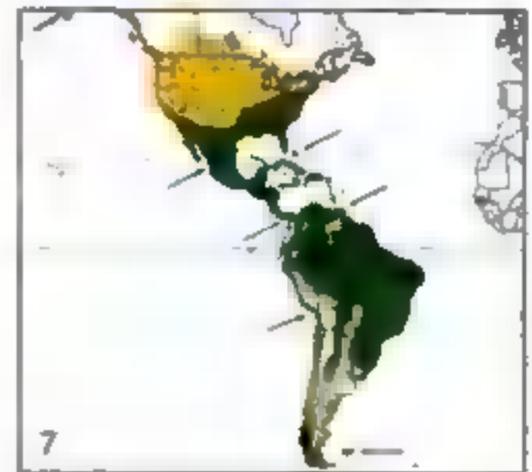
**2a Adult** (*septentrionalis*/nominate; N America S to Costa Rica/West Indies) Brown-black, glossed on back, scaled grey-brown on wings; head dull red; bill ivory, legs reddish to whitish. Flight below (**2ax**): black with silvery remiges, grey tail.

**2b Adult** (*ruficollis*; Panama, lowland S America to N Argentina) Blacker; less scaled; yellowish nape-bands, or crown-patch.

**2c Adult** (*jota*; Colombian Andes to Patagonia and Falklands) Clearer greyer scaling above; head bright red (no yellowish as b).

**2d Juvenile** (*septentrionalis*) Thin buff scaling on wings; head dusky with brown fuzz on crown/nape; bill dusky with paler base.

Text and map page 306



### 3 Lesser Yellow-headed Vulture *Cathartes burrovianus*

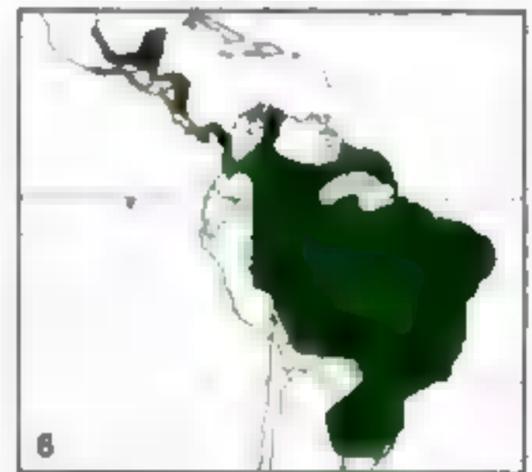
L53–65 cm (23 in): S150–165 cm (62 in): T19–24 cm (8 in): ♂96%

Marshland, wet savannah, riverine forest, to 1,000 m. Rather smaller/slimmer than 2 and 4; tail relatively short. Gliding buoyant/rocking as 2, but usually lower over ground; seldom soars high. More often on posts/other low perches. [see 2]

**3a Adult** Black above, somewhat glossed; browner below; wrinkled head varies from yellow to orange, even red on forehead and nape (**3ax**), but grey-blue on central crown and sometimes throat; bill/legs flesh to whitish. Flight below (**3ay**): black with silvery remiges, grey tail, much as **2ax**. Above (**3az**): whitish shafts to outer primaries form distinct pale area.

**3b Juvenile** Head/bill dusky but for whitish nape; legs yellow-white.

Text and map page 309



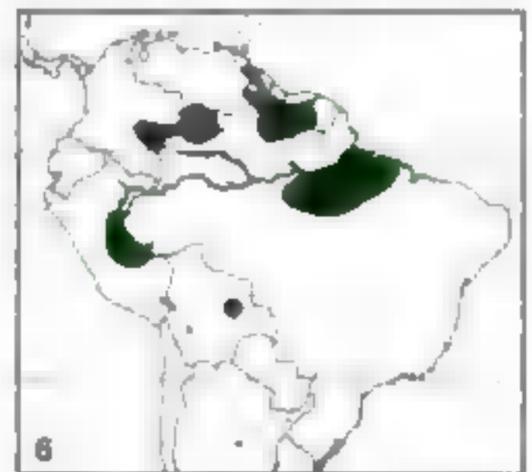
### 4 Greater Yellow-headed Vulture *Cathartes melambrotus*

L64–76 cm (28 in): S166–178 cm (68 in): T25–29 cm (11 in): ♂99%

Forest, forest edge, to 700 m. Bulky vulture; broader-winged than 2/3, larger/longer-tailed than 3. Flight heavier, less buoyant/rocking than 2/3; glides on flattish wings or in only slightest V. Mostly solitary, rarely groups; sometimes roosts on high exposed branches with other vultures (esp. 2). [cf. 3/2/1]

**4a Adult** Much glossier velvety-black than 2/3; head rich yellow but for blue on central crown and spot by eyes; bill whitish to flesh, legs dingy white with darker feet. Flight below (**4ax**): still two-tone effect, but remiges browner-grey while dusky inner primaries form contrasting patch. [Above, primary quills white as **3ax**.] [Juvenile: less whitish on nape than **3b**.]

Text and map page 310



### 1 Black Vulture *Coragyps atratus*

L56–74 cm (26 in): S133–160 cm (58 in): T16–21 cm (7 in): ♂102%

Open and wooded country, towns, to 2,700 m. Smallish vulture; short broad wings/tail, bare head; wing-tips reach tail-tip. Mixes stiff shallow flaps, wings forward, with glides on flat wings upswept; soars flat or in slight V. Gregarious. [cf. 2/3/4/7b]

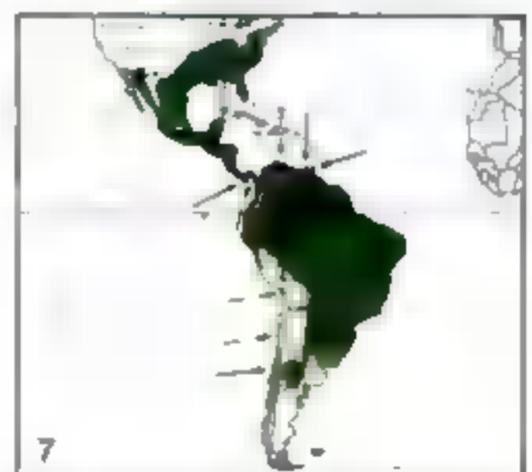
**1a Adult** (nominate; USA) Black, glossed on back/shoulders; wrinkled grey-black head; bill-tip ivory, legs whitish. Flight below (**1ax**): white primary patches. [Only shafts white above, as d.]

**1b Adult** (*brasiliensis*; Mexico to Brazil) Small; bolder wing-patch.

**1c Adult** (*joetens*; Ecuador to Chile, Argentina) Wing-patch obscure.

**1d Juvenile** Much as a–c, but body duller black; head blacker, less wrinkled, more bristly; bill all dark. [Underwings similar.]

Text and map page 305



2b

2d

2a

2c

2av

2av

2av

2av



3b

3av

3a



4a



1d

1a



1av

1b

1c

## PLATE 5: LARGER NEARCTIC AND NEOTROPICAL VULTURES

### 7 King Vulture *Sarcoramphus papa*

Text and map page 315

L71–81 cm (30 in): S170–200 cm (72 in): T21–26 cm (9 in): ♂109%

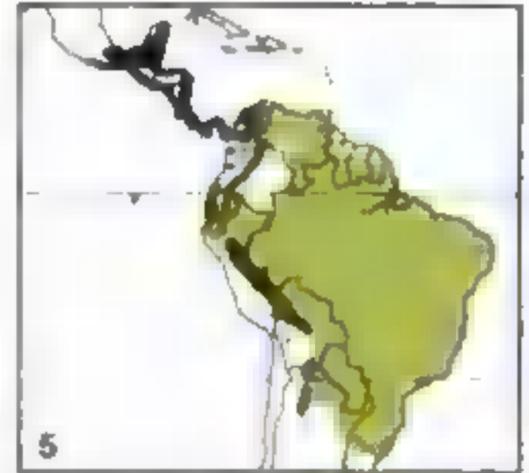
Forest, savannah, to 1,500 m; casual to 3,300 m. Solid vulture; broad squarish wings, shortish squared tail, caruncled head, heavy bill; wing-tips reach tail-tip. Stiff shallow beats; glides/soars on flat wings upswept. Often singly. [cf. 1–4 juveniles]

**7a Adult** Creamy body/shoulders; black rump/tail/remiges, greyer ruff; multicoloured head (top bristly, sides corrugated) and neck with pendant mauve lobe on lores, orange wattle on cere; red-ringed eyes white, legs dusky. Flight below (**7ax**): white and black (pattern much as Wood Stork *Mycteria americana*).

**7b Juvenile** All sooty, or obscurely mottled whitish below; bare parts dark, bill tinged red; no caruncles. Flight (**7bx/y**).

**7c Second- to third-year** Black above, white below, dark collar; partly orange bill/head, caruncles developing; eyes yellow-grey to whitish.

**7d Third- to fourth-year** In flight. Wing-coverts, scapulars and, later, back turn white mottled with black-brown, heaviest on mantle.



### 5 California Condor *Gymnogyps californianus*

Text and map page 311

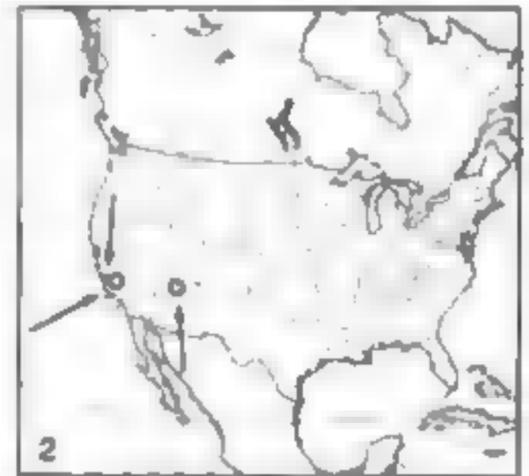
L109–127 cm (46 in): S249–300 cm (108 in): T33–38 cm (14 in): ♂109%

Dry foothills, mountains; extinct in wild, releases from captive stock since 1992. Huge vulture; long broad wings, shortish squared tail (juv. slightly wedged), bare head, deep bill; wing-tips near tail-tip. Slow stiff beats; glides/soars in flat V, fingers brush-like. Solitary/social. [cf. 2d, 47bc/225]

**5a Adult** Blackish, thinly edged brown above, streaked grey on ruff, with white tips, fringes to greater coverts/secondaries; wrinkled head red-orange to yellow, black bristly patch on forehead; pinkish neck redder in front; eyes red, bill whitish-yellow, legs dusky-pink to whitish. Flight below (**5ax**): white band along wing-linings, orange head, pale legs and (often visible) bare red strip on breast. [Above: white-tipped greater coverts and silver-washed secondaries.]

**5b Juvenile** Much as a, but head dusky with fuzzy down on neck; eyes grey-brown, bill black. Flight below (**5bx**): whitish band along wing-linings heavily mottled black; tail more pointed.

**5c Third-year** Some orange, mainly at neck-base; eyes redder. Flight below (**5cx**): white on wing-linings reduced or lost; tail as a. [From c4-yr, wing-linings whiter again, head more orange (still mottled blackish), neck-ring redder; adult by 6/7-yr.]



### ■ Andean Condor *Vultur gryphus*

Text and map page 313

L100–122 cm (44 in): S274–310 cm (115 in): T33–40 cm (14 in): ♂126%

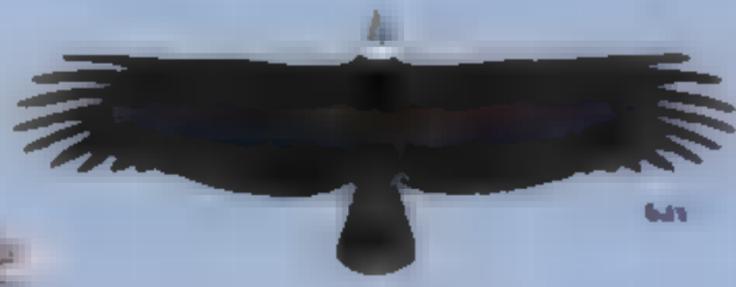
Mountains 1,800–5,200 m, coastal lowlands in S. Huge vulture; long broad wings, longish rounded tail, bare head (male with caruncles); wing-tips short of tail-tip. Flight as 5; soars on flatter wings. Solitary/social. [cf. 1–4 juveniles/7/also eagles]

**6a Adult male** Black with silvery-white secondaries/larger coverts, white ruff; dull reddish head with fleshy comb and dewlap; eyes grey-brown, bill tipped ivory, legs dusky. Flight below (**6ax**), white ruff, sometimes streaks on inner secondaries. Above (**6ay**): much white on rear inner two-thirds of wings.

**6b Adult female** Head appendages lacking or much reduced; eyes red.

**6c Juvenile** Dull black, scaled paler, with brown ruff/inner coverts; head brown with fuzzy down on neck; eyes/bill brown. Flight above (**6cx**): all dark, but ruff/inner wings slightly paler.





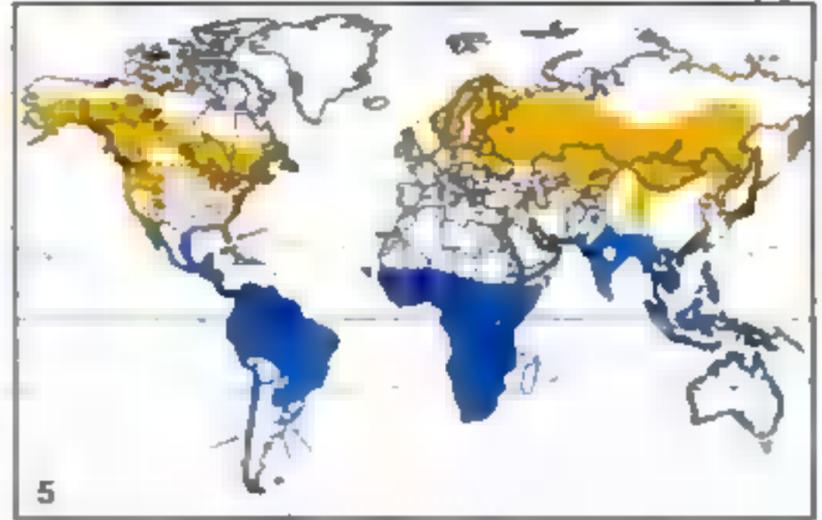
## PLATE 6: OSPREY AND WESTERN HONEY-BUZZARD

### 8 Osprey *Pandion haliaetus*

Text and map page 317

L50–66 cm (23 in): S127–174 cm (59 in): T17–23 cm (8 in): ♂85%

Fresh/salt water, to 3,300 m. Mid-sized fish-eating hawk; long pointed angled wings look gull-like; shortish tail, prominent head; wing-tips exceed tail-tip. Slow shallow flexible beats; glides/usually soars on arched wings, hands dropped, wrists forward. Dives into water, feet-head first, from clumsy hover (**Baz**) or glide. Solitary/social. [cf. fish-eagles e.g. 42c/47d; 67]



**8a Adult male** (nominate; Pal and winters Afr/Ind) Dark brown above, paler barred tail; creamy head/underparts with broad dark eye-band, streaky rusty-buff gorget (♀ wider); eyes yellow; cere/feet blue-grey. Flight below (**8ax**: ♂) white with bold gorget, black carpal patches, wing-diagonals, wing-tips, barred greyish remiges/tail. Above (**8ay**). Also hover-diving (**8az**).

**8b Adult** (*carolinensis*; Nea and winters Neo; ♂) Slightly larger; darker above; gorget largely absent (♀ has few short streaks).

**8c Adult** (*crinitus*; Australia to Java/Philippines; male) Smaller; head whiter, eye-stripe narrower; gorget stronger.

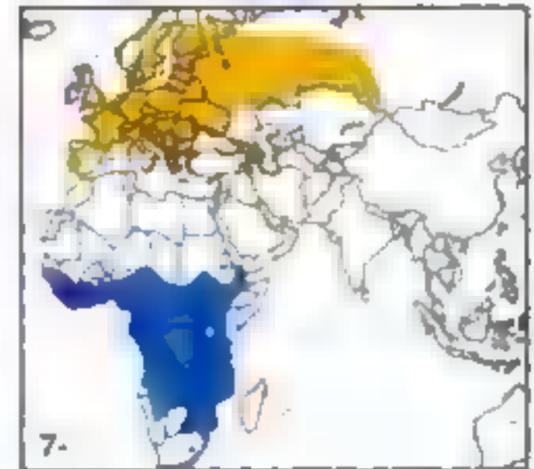
**8d Juvenile** (nominate) Heavier crown-streaks (nape tinged rufous at first); cream-scaled above, broad tail-tip; whiter gorget; eyes orange. [As a, once pale tips lost in first 6 months.]

### 18 Western Honey-buzzard *Pernis apivorus*

Text and map page 336

L50–60 cm (22 in): S118–144 cm (52 in): T21–27 cm (9 in): ♂94%

Forest with clearings, woods, to 1,500+ m. Largish buteo-like kite; long wings often pinched in at body; longish tail (juvenile shorter) notched with rounded corners; protruding cuckoo-like head, small bill; wing-tips nearly to subterminal tail-band. Deep flexible beats; glides on flat or slightly bowed wings, wrists forward, hands back; soars on flat 'parallel-edged' wings; no hovering. Roller-coaster display; quivers raised wings at zeniths. Solitary/migrating flocks. [cf. 19/203/206/204/280/67–72]



**18a Barred adult male** Grey-brown above; cheeks grey (female brown); thin streaks on cream throat/chest, cinnamon/sepia bars on white abdomen; eyes oranges-red (female yellow), cere blue-black. (Prey: nest of wasps *Vespula*.) Flight below (**18ax**: ♀): bars blackish on breast/linings, rufous on belly/thighs (or all bars dark); barred greyish tail, broad distal and 2–3 basal bands (echoed on wings); black carpals; note adult ♀ has dark fingers (cf. **bx/c**).

**18b Dark adult female** Dark chocolate with black shaft-streaks; here pale throat, some white spots on nape/breast, broken bars on flanks/thighs/crissum. Flight below (**18bx**: ♂): dark bird with wing-linings as body (carpals hardly show), dark secondaries; note adult male dark 'fingernails' (female has dark fingers, juvenile has dusky hands).

**18c Pale adult (male)** Flight below. Creamy with only few dark streaks on breast, spots on flanks; bold carpal patches, remiges/tail much as a. Above (**18cx**): warm grey-brown; grey cheeks (♂) sharply demarcated from white throat; typical tail pattern.

**18d Dark juvenile** Flight below. Often blackish; here chestnut with speckly throat, whitish-banded strip on mid-wings; this tail atypical (normally as **18ex**). Above (**18dx**): dark brown; thin pale tips forming lines on mid-wings and rump; pale windows.

**18e Pale juvenile** Brown above, tipped white; creamy head/underbody with speckly dark eye-patch, brownish nape-spots, streaks below; eyes brown, cere yellow (cf. **a**). Flight below (**18ex**): streaky chest, speckly carpals; here brown bars on belly and flanks, bars/streaks on linings. Above (**18ey**): eye-patch; mottled mantle/shoulders; clearer lines and windows than **d**.



## PLATE 7: OLD WORLD KITES

### 37 Red Kite *Milvus milvus*

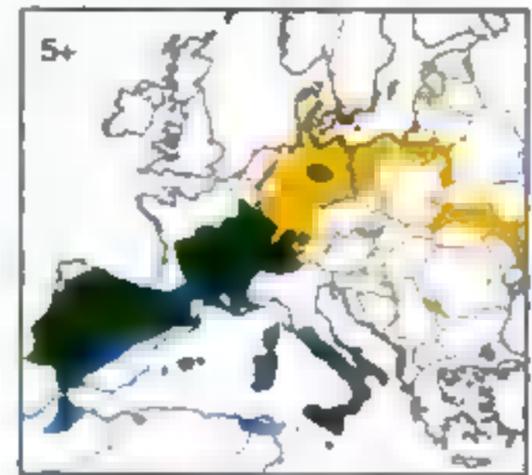
L60–72 cm (26 in): S143–171 cm (62 in): T30–38 cm (13 in): ♂87%

Broadleaf woods, valleys, wetland edges, to 800 m. Large slim kite; long wings (5 fingers), forked tail; wing-tips to fork. Deep fluid beats; glides/soars on slightly arched wings, wrists forward, tips back, with twisting tail. Solitary/social. [cf. 39]

**37a Adult** Mainly rufous; streaky whitish head. Flight below (**37ax**): pale head, dark-streaked rufous body/linings, whitish windows, dark-cornered translucent rufous tail. Above (**37ay**): whitish crown; buff panels on wing-coverts, pale windows; rusty tail.

**37b Juvenile** Flight below. Paler mottled body contrasts more with wings, less with tail; subterminal tail-band; greater coverts pale-tipped. Above (**37bx**): darker crown, clearer wing-panels, pale-tipped primary coverts, subterminal band on duller tail.

Text and map page 376



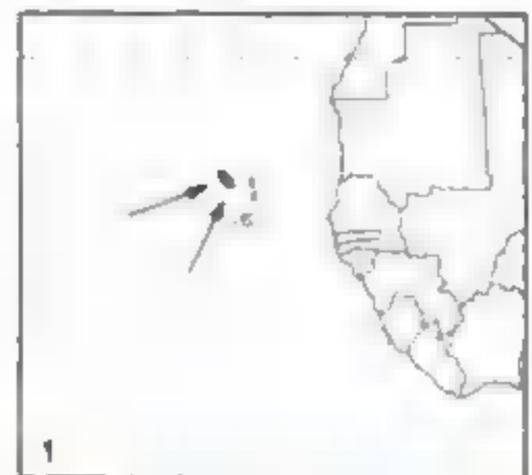
### 38 Cape Verde Kite *Milvus fasciicauda*

L50–62 cm (21 in): S134–152 cm (57 in): T27–35 cm (12 in): ♂93%

Usually treated as race of 37, but intermediate in characters between it and 39, with which has interbred. Now only on Santo Antão (outermost NW island) to 1,500 m (2,000 m), and virtually extinct there. Wings shorter than 37 and rounder-tipped than 37 or 39; looks shorter-tailed, fork intermediate. [cf. 37/39]

**38a Adult** Smaller, browner than 37, with black bill; size similar to W populations of 39, but thinly rufous-edged above, redder and clearly streaked below; contrasting rufous crown and whitish face; brown bars on dull reddish tail. Flight (**38ax**): underbody and wing-linings dull rufous with black shaft-streaks; wing-panels above and primary windows below much as **37ax/y**, but latter marbled grever. [Juvenile broadly rufous-edged above and buff-mottled below; browner tail more barred.]

Text and map page 379



### 39 Black Kite *Milvus migrans*

L46–66 cm (22 in): S120–153 cm (54 in): T21–35 cm (11 in): ♂86%

Ubiquitous, to 4,900 m. Stockier than 37; 6 fingers, notched or triangular tail; wing-tips nearer tail-tip. Glides/soars on slightly arched wings held forward; can hover, snatches food from water. Gregarious (e.g. at food/roost). [cf. 37/40/41de/100b/290b]

**39a Adult** (nominate; W Pal, winters Africa) Brown above, head paler, tail barred; dark red-brown below. Flight below (**39ax**): paler head/windows. Above (**39ay**): panels/windows duller than on 37.

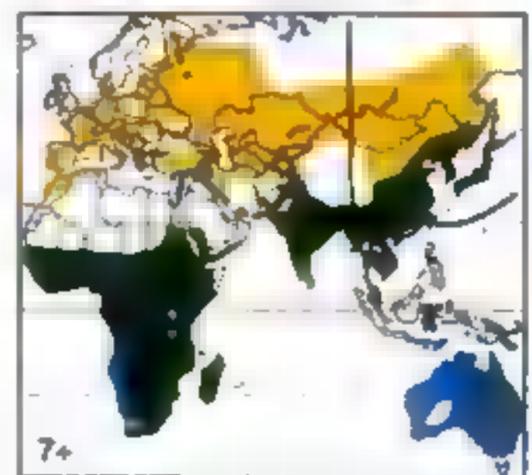
**39b Adult** (*lineatus*; Asia) Flight below. Larger; browner-headed, less rufous below; paler belly/tail; bold windows more as 37.

**39c Adult** (*gavinda*; S Asia) Flight below. Smaller; wing-windows and colour intermediate between a and b, with more rufous head.

**39d Adult** (*parasitus/egyptius*; most of Africa) Yellow bill (not juveniles).

**39e Juvenile** (nominate) In flight. More contrasted than a; buff-spotted above; clearer wing-panels/windows/line on greater coverts; creamy breast-streaks, paler belly; two-tone tail cream-tipped.

Text and map page 381



### 25 Black-shouldered Kite *Elanus caeruleus*

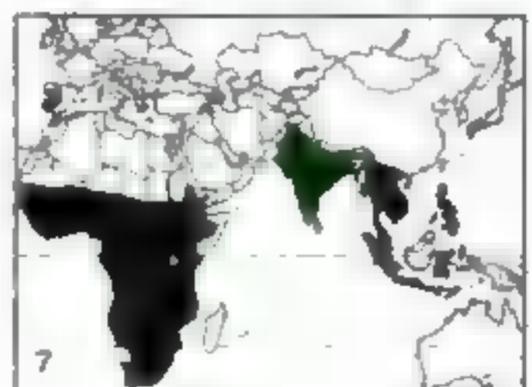
L31–37 cm (13 in): S77–92 cm (33 in): T11–15 cm (5 in): ♂91%

Savannah, wood edges, cultivation, semi-desert, to 3,000 m. Small falcon-shaped kite; long pointed wings exceed notched tail. Fast cupped beats; glides/soars on raised arms forward, level hands back; hovers. Solitary/social. [cf. 96a/28]

**25a Adult** Grey/white; black shoulders, black-rimmed red eyes; often lifts/wags tail. Flight below (**25ax**): white; dusky primaries, grey tips to secondaries. Above (**25ay**): grey; darker-tipped wings, black shoulders, light tail-edges. Hovering (**25az**).

**25b Juvenile** Browner; streaky crown; white tips to back, scapulars, greater coverts and quills soon lost; but black areas as a; eyes greyish to brown to orange to red. Flight above (**25bx**).

Text and map page 355





37a



37aa



37b



37by



38ax



39ay



37ba



38a



39ax



39c



39e



39a



39b



39d



25bx



25by



25bz



25b



25c

DAVID MURDO

25ax

## PLATE 8: SCISSOR-TAILED KITE, CUCKOO-HAWKS AND BAT-HAWK

### 28 Scissor-tailed Kite *Chelictinia riocourii*

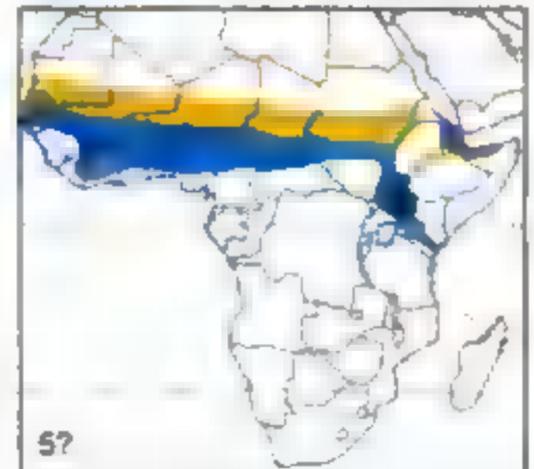
L33–38 cm (14 in): S68–76 cm (28 in): T17–22 cm (8 in): ♂94%

Semi-desert, dry savannah, to 500 m. Small slim tern-like kite; long pointed wings, long deep-forked tail (but see **b**), weak bill, short legs; wing-tips half down tail. Fast buoyant beats; much on wing; soars on raised arms; hangs and hovers. Insectivorous. Gregarious; noisy at colonies/roosts. [**b25b**]

**28a Adult** Pale grey above; black patch by red eyes, sooty-edged scapulars, white-tipped remiges; white below; cere grey. Flight below (**28ax**): black carpal strips, greyish primaries.

**28b Juvenile** Browner above, edged rufous; rounder wings and notched tail shorter, cream-tipped; buff chest-band with thin streaks; eyes grey. Flight below (**28bx**): chest-band; greyer quills.

Text and map page 362



57

### 9 African Cuckoo-hawk *Aviceda cuculoides*

L38–43 cm (16 in): S85–95 cm (35 in): T18–21 cm (8 in): ♂90%

Forest, wet savannah, to 3,000 m. Smallish cuckoo-patterned kite; looks accipitrine, but long wings more pointed; slight crest, short legs; wing-tips short of tail-tip. Slow beats; glides/soars on flat wings. Still-hunts. Solitary. [cf. 104–107/163/111]

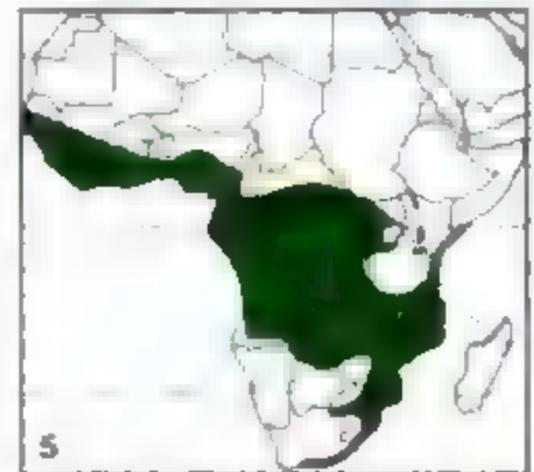
**9a Adult male** (nominate; Senegal, DR Congo) Dusky above, grey head/chest; grey bands on black tail; abdomen barred rufous-white. Flight below (**9ax**): rusty wing-linings, black-edged silvery remiges.

**9b Adult female** Browner; broader tail-bands; vaguer barring below.

**9c Adult** (*verreauxi*; DR Congo S; ♂) More rufous on nape. Flight (**9cx**; ♀): linings barred rufous-white as body; more barred remiges.

**9d Juvenile** Dark brown above, edged buff; white supercilia; white below, drop-shaped spots. [Wing-linings dark-speckled buff.]

Text and map page 321



5

### 10 Madagascar Cuckoo-hawk *Aviceda madagascariensis*

L40–44 cm (17 in): S90–100 cm (37 in): T20–23 cm (8 in): ♂95%

Forest and edge, wooded savannah, scrub, marshes, to 1,800 m. Smallish kite, but larger than **9**; rather hawks-like at rest; eyes large and protruding; white underparts with rufous-brown flanks and breast-band; long wings rounder-tipped; lacks cuckoo-pattern. Slow heavy beats; glides on flattish wings; apparently seldom soars. Solitary. Crepuscular. [cf. 205]

**10a Adult** Brown above, streaked on paler head; tail-coverts mottled white; 3 pale grey-brown tail-bands, basal 2 variably marked with white; white below, throat streaked brown, breast/flanks variably blotched; cere mid-dark grey; feet and legs dull yellow-grey with slight pink cast. Flight below (**10ax**): brownish linings mottled white; whitish quills barred dusky.

**10b Juvenile** Much as **a**, but darker brown above; more white-streaked head; more white at base of tail; darker markings below.

Text and map page 323



4

### 22 Bat-hawk *Macheiramphus alcinus*

L41–51 cm (18 in): S95–120 cm (42 in): T15–19 cm (7 in): ♂83%

Woods near caves, towns, to 2,000 m. Mid-sized falcon-like kite; long pointed wings, shortish tail, pointed crest, small bill but huge gape, big eyes; wing-tips near tail-tip. Silent slow beats/glides. Crepuscular; eats bats whole. [cf. falcons]

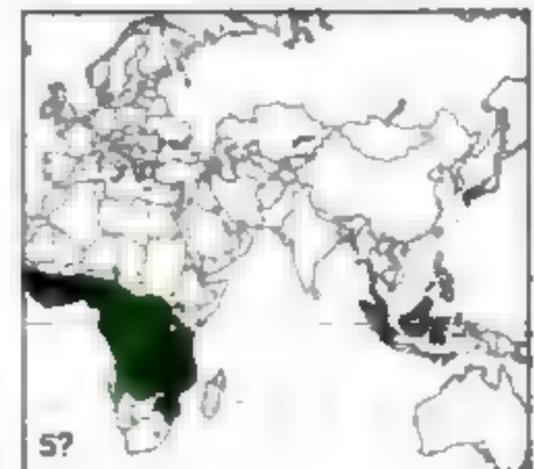
**22a Adult** (nominate; SE Asia) Brown-black; white by eyes, white throat-sides/chest, often belly; cere grey, feet blue-grey.

**22b Adult** (*anderssoni*; Africa/Madagascar) Chasing bat. Sooty-brown; white or browner throat-sides; faint pale tail-bars, primary spots.

**22c Pale adult** (?subadult) (*anderssoni*) Browner, white spots on nape; pale bars on tail; white below blotched brown [linings, too].

**22d Juvenile** (nominate) Browner above than **a**, with some white mottling; mostly white below with variable blackish blotches (cf. **c**).

Text and map page 350



57



## PLATE 9: INDOMALAYAN AND AUSTRALASIAN BAZAS

### 11 Jerdon's Baza *Aviceda jerdoni*

L40–49 cm (18 in): S80–100 cm (35 in): T19–24 cm (8 in): ♂91%

Forest/edges, at 150–1,850 m. Mid-sized kite; broad rounded wings, longish tail, long crest, short legs; wing-tips well down tail. Slow flexible beats; glides on V wings, soars on flat. Pairs/families. Shy; crepuscular. [cf. 109/110/237–245/19]

- 11a Adult male** (nominate; SE Asia) Dark brown above, edged rufous on nape/mantle; whitestipped blackish crest, barred remiges; 5 dark bands on buff-tipped tail; black stripe on white throat; chest rufous, abdomen barred brown/white; cere blue-grey.
- 11b Adult** (*ceylonensis*; Sri Lanka/S India) Smaller; paler above, narrower tail-bands; paler chest, less barred underbody.
- 11c Adult** (*celebensis*; Sulawesi/Sula) Also smaller; but dark with black-streaked rufous head, rich rufous chest, bold barring.
- 11d Adult female** (nominate) Flight below. Unevenly banded tail recalls **19**, but has pale tip; wing-linings barred as body, grey-white remiges evenly banded at tips. [♂ darker chest and barring.]
- 11e Juvenile** (nominate) Scaled buff above; whiter head/underparts streaked black, blotched rufous; 3–4 more even bands on tail.

Text and map page 324



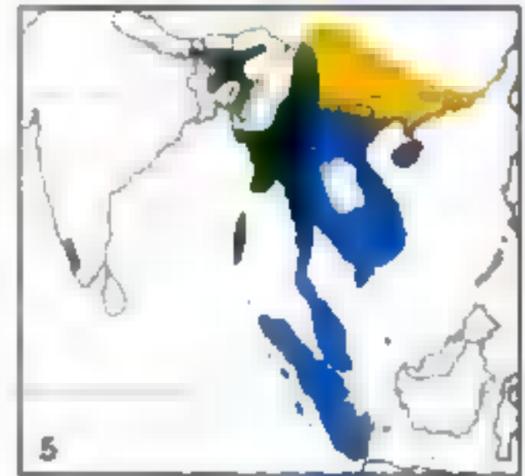
### 13 Black Baza *Aviceda leuphotes*

L28–35 cm (12 in): S64–74 cm (27 in): T13–15 cm (6 in): ♂96%

Forest with glades/streams, to 1,500 m. Smallish chunky kite; broad rounded wings, moderate tail, long crest often erect; wing-tips well down tail. Crow-like in flight, among trees. Hovers at or hangs from foliage to feed. Social; crepuscular.

- 13a Adult** (nominate; SW India/S Burma/China, winters to Malaya) Black; white blotches on back; chestnut, or chestnut and white, patch on secondaries; white/black/chestnut breast-bands; rufous bars on white breast/flanks; cere grey, feet black. Flight above (**13ax**): white blotches; rufous, white and black secondaries.
- 13b Adult** (*siamica*; Nepal/Burma, winters to S India) Less chestnut and white above; darker bars below. Flight below (**13bx**): black head/linings/chest-band/vent; white chest, barred breast; silvery tail-base, black-tipped primaries, grey secondaries.
- 13c Juvenile** (nominate) Duller, browner; more white on back, but less on secondaries; streaked white on throat and brown on chest.

Text and map page 328



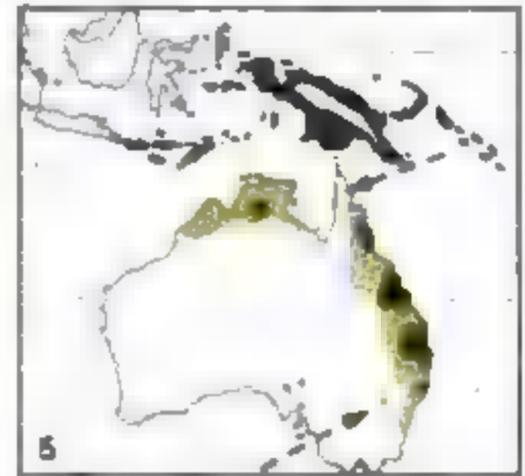
### 12 Pacific Baza *Aviceda subcristata*

L35–46 cm (16 in): S80–105 cm (36 in): T19–23 cm (8 in): ♂92%

Forest, savannah, mangroves, gardens, to 1,500 m (1,700 m). Mid-sized kite; longer wings than **11**, narrower near body; pigeon head, short crest; more cuckoo-patterned. Loose shallow or deep rowing beats; glides on flat wings, wrists forward, trailing edges S-curved. Snatches prey from foliage/stretchers to it. Pigeon-like display-flight. Two-note whistle. Social. [cf. 119/139]

- 12a Adult male** (nominate; NE/E Australia) Grey head/chest, black-tipped tail, darker crest/wings, brown scapulars; barred brown/cream below, rufous thighs/crisum; cere slate, feet grey. [♀ more rufous below, browner above.] Flight below (**12ax**): barring to axillaries; rufous linings; silvery quills; barred wing-tips, dark rear edges; black tail-end, white corners, 2 basal bars.
- 12b Adult** (*njikena*; NW Australia) Smaller; blacker; blacker barring.
- 12c Adult** (*rufa*; N Moluccas) Also small/mid-sized; reddest race, with rufous wash on much of head/chest and bold rufous barring below.
- 12d Juvenile** Brown above, scaled rufous; whitish throat, grey-rufous collar, fainter barring to vent; cere cream to blue-grey.

Text and map page 325





11a

11b

13a

13b

11c

11c

13c

13a

13b

11d

12a

12a

12b

12c

12d

## PLATE 10: ASIAN AND AUSTRALASIAN HONEY-BUZZARDS

### 16 Long-tailed Honey-buzzard *Henicopernis longicauda*

L50–61 cm (22 in): S105–140 cm (48 in): T29–37 cm (13 in): ♂89%

Forest, to 3,000 m. Largish kite; long broad wings; wing tips half way down tail. Flies with wrists forward, curved rear edges cut in at body; soars flat. Diurnal/crepuscular. Solitary. [cf. 157]

**16a Adult** Brown-black above, head streaked whitish, back/wings barred brown-grey; 4 brown-grey bands on tail; cream to buff below, streaked blackish, most heavily on breast; cere/feet bluish-white. Flight below (**16ax**): linings thinly streaked blackish, as throat/belly; quills banded grey and blackish.

**16b Juvenile** Tail and primaries (inset **bx**) have the subterminal dark and adjacent pale bands clearly narrower than on **a**; looks all paler/more barred above from same pattern on other feathers.

Text and map page 334



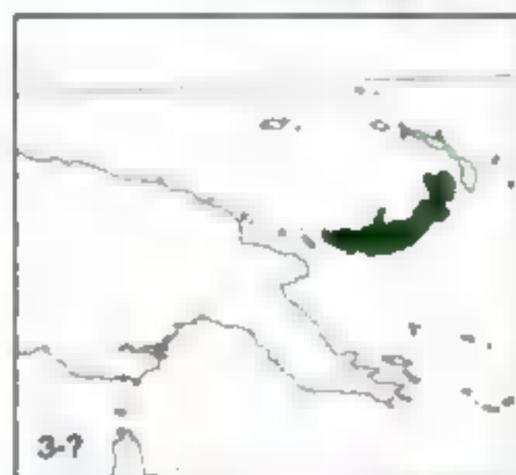
### 17 Black Honey-buzzard *Henicopernis infuscatus*

L48–52 cm (20 in): S110–115 cm (44 in): T25–27 cm (10 in): ♂90+%

Forest, below 1,600 m. Largish kite; long broad wings, longish tail; shape and, apparently, character very much as **16**, and sometimes treated as conspecific, but smaller, relatively shorter-tailed and far darker. Little known; mostly seen when gliding/soaring on flat wings over forest ridges. Solitary.

**17a Adult** Mainly black above and blackish below, mixed with little white on crown/nape, cream on throat, buff on thighs/crissum; 2–3 brown-grey bands on tail, 2 on remiges; feet blue-white. Flight below (**17ax**): black body and wing-linings; slightly paler throat and crissum; remiges and tail banded black and whitish. [Juvenile similar, apart from more pointed primaries.]

Text and map page 335



### 19 Eastern Honey-buzzard *Pernis ptilorhynchus*

L53–65 cm (23 in): S115–155 cm (53 in): T24–29 cm (10 in): ♂85%

Forest, cultivation, semi-desert, to 1,800 m. Largish kite; as **18** but wing-tips rounder, head more crested, feet larger. **a** is possibly distinct species. [cf. 18/11/203/206/207/209/237–243/109]

**19a Adult female** (*orientalis*, E. Asia, winters S to Java) Tiny crest; larger than **18**, morphs less extreme, tail-bands stronger; here pale with dark gorget. Flight (**19ax**: ♂): barred morph [cf. **18a**].

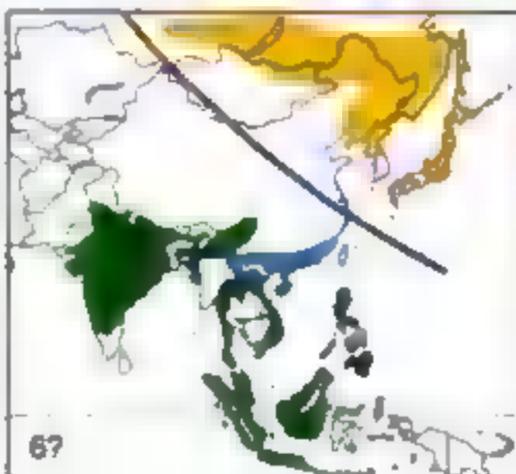
**19b Adult male** (*ruficollis*, S Asia) Slight crest; short-winged; often barred or brown, rufous neck; can have white throat, dark gorget. Dark morph (**19bx**: ♀): all dark sepia. [Dark morph also in **c**.]

**19c Adult male** (*torquatus*, SE Asia/Borneo) Long crest; brown; rufous neck, dark gorget, brown barring. 'Tweeddale' morph (**19cx**: ♂): mainly blackish, but white throat, bold white barring below.

**19d Adult female** (*philippensis*, Philippines) In flight. No crest; large, but short-winged; paler, less barred.

**19e Juvenile** (*ruficollis*) Head whitish. Flight (**19ex**): rufous morph.

Text and map page 342



### 20 Barred Honey-buzzard *Pernis celebensis*

L50–58 cm (21 in): S110–125 cm (46 in): T25–28 cm (10 in): ♂87%

Forest, to 1,100 m (2,000+ m). Largish kite; shorter-winged than **18/19**; short primary projection; crest short or long. [cf. 19/240]

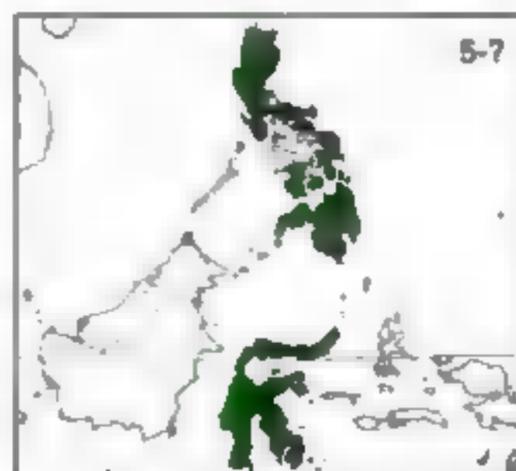
**20a Adult male** (nominate; Sulawesi) Short crest; black crown; brown above; paler tail with broad blackish bands, 2–3 thinner basal bars; white throat and rufous-buff chest streaked blackish, abdomen barred. Flight below (**20ax**): linings barred; greyish remiges barred most on primaries.

**20b Adult** (*steerei*, Philippines) Long crest; paler barring below.

**20c Juvenile** (nominate) Much paler than **a**, edged paler still above; less clearly streaked and barred below; 5 dark tail-bars.

**20d Juvenile** (*steerei*) Flight below. Less marked than **c**, linings often and body sometimes plain white/cream; crest shorter than **b**.

Text and map page 346





DAVID MEAD

## PLATE 11: ENDEMIC AUSTRALIAN KITES

### 35 Square-tailed Kite *Lophoictinia isura*

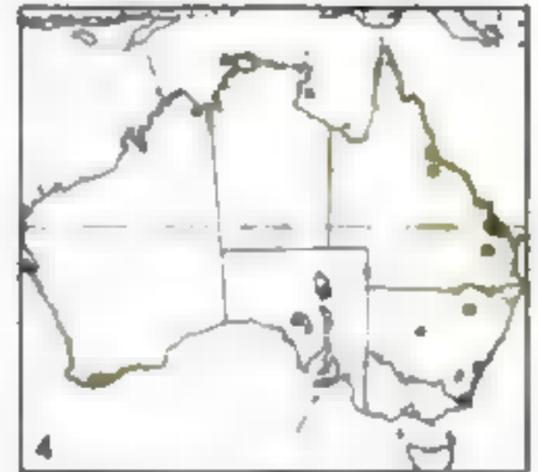
L50–56 cm (21 in): S131–146 cm (55 in): T25–28 cm (10 in): ♂89%

Forest/scrub, to 1,000 m. Large slim kite; long splay-fingered wings, long square/notched tail, slight crest; wing-tips just exceed tail. Shallow loose beats; glides/soars in shallow V, wrists forward, tail twisting. Solitary. [cf. 36/39/101/156/231a]

**35a Adult** Creamy face; dark-streaked rufous nape/underparts; dark brown above, mottled pale shoulders; cere/feet flesh-white. Flight below (**35ax**): rufous linings, black carpal arcs; barred primaries, whitish windows; dark-tipped secondaries; greyish tail with faint bars, subterminal band. Above (**35ay**): dark with creamy forecrown/face, pale diagonal wing-panel.

**35b Juvenile** No white face; rufous head/underparts finely streaked; edged/scalloped rufous above, especially shoulders; rump often pale.

Text and map page 372



### 36 Black-breasted Kite *Hamirostra melanosternon*

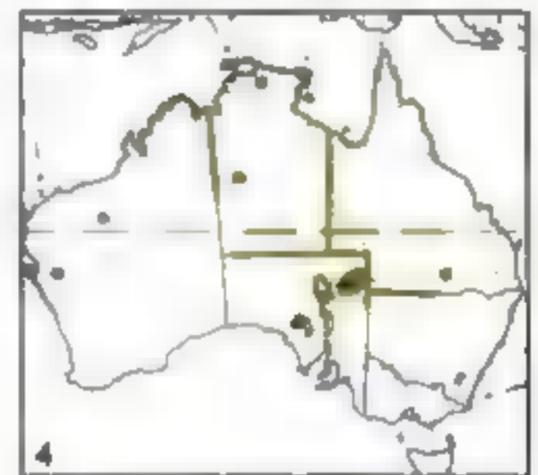
L51–61 cm (22 in): S141–156 cm (58 in): T20–22 cm (8 in): ♂94%

Woods in desert, esp. river trees, to 1,000 m. Large eagle-like 'kite' (relationships uncertain); long, broad even wings, stub tail, big bill/legs, slight crest; wing-tips well exceed tail. Deep strong or flat fast beats; sails rocking on huckswepth upcurved V wings. Hoarse yelps. Solitary, except at food/roosts. [cf. 231b; b35/41b/156]

**36a Adult** Blackish face, breast/back; rufous nape/shoulders/abdomen; brown tail; cere/legs flesh-white. Flight below (**36ax**): plain patterns, white windows; dusky-rufous linings, crissum, pale tail. Above (**36ay**): rufous forewings, pale windows. Eating eggs of Emu *Dromaius novaehollandiae* (**36az**): throws stones with bill to break them. [Supposed 'pale morph' is 2–3-yr; see b.]

**36b Juvenile** Rufous; paler head, black mottling above, chest-streaks, unbarred primaries, tail. [2–3-yr browner; streaks heavier.]

Text and map page 374



### 26 Australian Black-shouldered Kite *Elanus axillaris*

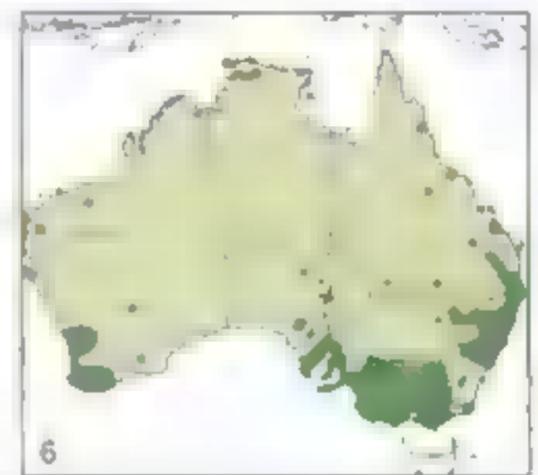
L33–37 cm (14 in): S82–94 cm (33 in): T14–15 cm (6 in): ♂96%

Woods, grassland/croplands, urban wastes, to 1,500 m. Small kite, like falcon; pointed wings, notched tail; wing-tips exceed tail. Shallow gull-like beats; sails in shallow V; hovers. Flicks tail. Solitary/social. Also crepuscular. [cf. 27/282/300/120]

**26a Adult** White with grey back/wings, darker primaries; shoulders black; black to behind eyes forms eyebrows (**26ax**); eyes red, cere horn/yellow, feet yellow. Flight below (**26ay**): white; dark wing-tips, black carpals. Hover (**26az**): fast flat beats.

**26b Juvenile** Rusty-brown head/back, mottled grey wings with darker shoulders, all white-tipped above; more rufous breast; eyes brown. Flight below (**26bx**): rufous breast; wing-tips browner.

Text and map page 359



### 27 Letter-winged Kite *Elanus scriptus*

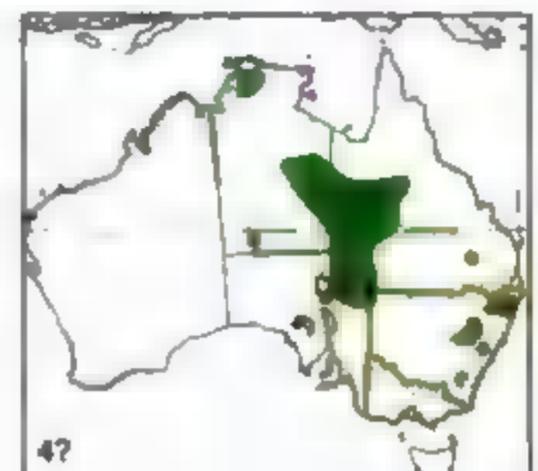
L34–37 cm (14 in): S84–89 cm (34 in): T14–16 cm (6 in): ♂87%

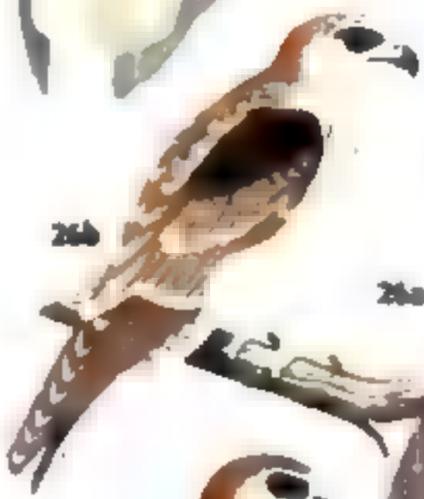
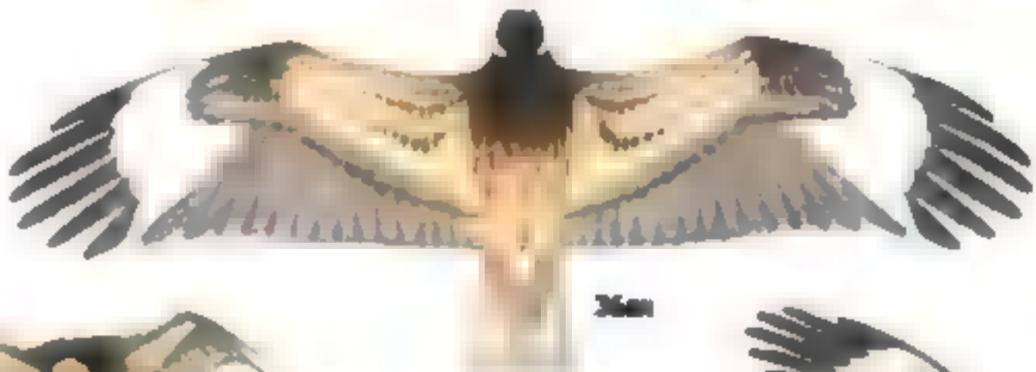
Timbered watercourses/grassland, to 1,000 m; eruptive. Like 26; note differences under a in face, cere, legs, underwings. More buoyant tern-like flight, deeper slower beats and hover, flutter-winged glide. Gregarious. Crepuscular/nocturnal. [cf. 26/282, 300/120]

**27a Adult** Like 26a, but more black in front of larger eyes and ring around give owl-like face (**27ax**); cere horn, legs cream to flesh-white. Flight below (**27ay**): variable black band along wings; paler grey primaries than 26, translucent secondaries.

**27b Juvenile** Browner, less mottled, above than 26b; more orange-brown on breast. Flight below (**27bx**): paler primaries; usually blackish band on wings (may be faint, broken, even absent).

Text and map page 360





DAVID MEAD

## PLATE 12: NEW WORLD KITES I

### 24 White-tailed Kite *Elanus leucurus*

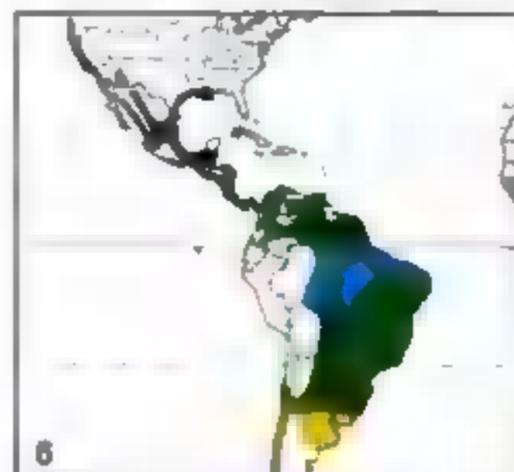
L35–43 cm (15 in): S88–102 cm (37 in): T15–19 cm (7 in): ♂94%

Grassland, savannah, marsh, to 1,000 m (2,500+ m). Smallish gull-like falcon-shaped kite; longish pointed wings, squared tail; wing-tips short of tail-tip. Deep graceful beats, cupped wings; glides on arched wings, hands level; soars in V; hovers. Solitary/social. Diurnal/crepuscular. [cf. 33–34; ♂94–95]

**24a Adult** Grey and white, with black shoulders; black patch by orange-red eyes. Flight below (**24ax**): white linings as body; black carpal patches; grey secondaries, blackish primaries.

**24b Juvenile** Grey-brown above, edged white on back, streaked on head; dark subterminal tail-band; black shoulders less obvious against darker wings; rufous specks on breast; brown eyes.

Text and map page 353



### 29 Snail Kite *Rostrhamus sociabilis*

L39–48 cm (17 in): S99–115 cm (42 in): T16–21 cm (7 in): ♂98%

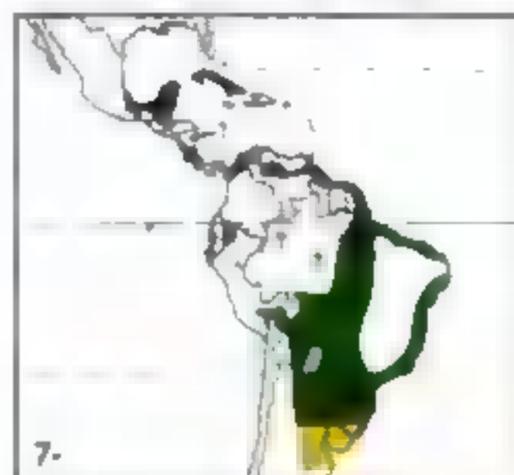
Fresh marsh, to 1,000 m. Mid-sized kite; paddle wings, notched tail, thin deep-hooked bill; wing-tips exceed tail-tip. Slow floppy beats; glides/soars on bowed wings. Gregarious/solitary. [cf. 15]

**29a Adult male** Slaty-black; white tail-base and tail-tip; eyes/lores red. Flight below (**29ax**): black band on white tail; orange legs.

**29b Adult female** Dark brown, edged rufous above, blotched cream below; buff supercilia/cheeks; tail as a; lores/legs yellow-orange. Flight below (**29bx**): linings darker than body; barred remiges usually pale-based, secondaries darker distally; two-tone tail.

**29c Juvenile** As b but broader edges, streaked crown; cream below with clearer streaks; eyes brown, lores creamy, legs yellowish.

Text and map page 363



### 30 Slender-billed Kite *Rostrhamus hamatus*

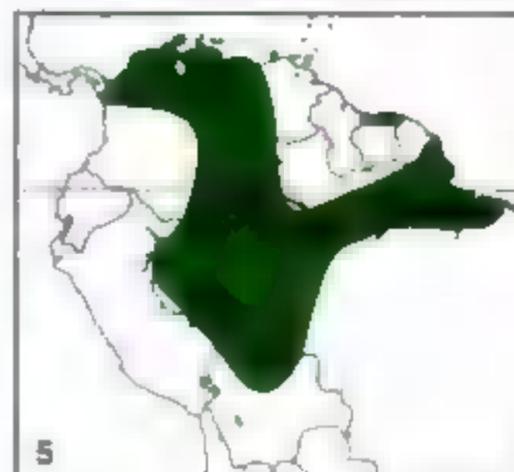
L35–41 cm (15 in): S80–90 cm (33 in): T11–14 cm (5 in): ♂95%

Forest lagoons, wooded swamps, also coffee plantations, to 750 m. Smallish kite, smaller and chunkier than 29; shorter broader wings, shorter squarer tail, similar hooked bill; wing-tips short of tail-tip. Faster flatter beats; glides on less bowed wings. Solitary/loose groups. [cf. 29; a15e/165/166]

**30a Adult** Dark slate-grey, blacker on remiges/tail; yellow-white eyes; lores/legs orange. (As 29, staple food apple snail *Pomacea*.) Flight (**30ax**): all slate, no white; orange legs.

**30b Juvenile** As a but for wing/tail-coverts edged rufous to cream, 2–3 whitish tail-bars and tail-tip. Flight below (**30bx**): dark but for tail-bars and obscure barring on dark-tipped remiges.

Text and map page 365



### 15 Hook-billed Kite *Chondrohierax uncinatus*

L39–51 cm (18 in): S78–98 cm (35 in): T17–23 cm (8 in): ♂89%

Wet forest, drier scrub, coffee, to 1,500 m (rare 2,700 m). Mid-sized kite; paddle wings, longish tail, heavy bill, short legs; wing-tips half down tail. Slow beats; glides/soars on slightly bowed wings. Solitary. [cf. 185 etc; e29–30/165–6/176–7; f14/148/265]

**15a Adult male** (nominant; C/S America) Slaty, usually thinly barred below; 1–2 tail-bands; eyes white; orange on green lores.

**15b Adult male** (*wilsonii*; Cuba) Paler grey; barred collar. Adult female (**15bx**): brownish head; rufous-barred collar/underbody. Bill yellow.

**15c Adult female** (nominant) In flight. Barred rufous/cream; banded quills. [Grey-brown above, dark crown, rufous collar, 2 tail-bands.]

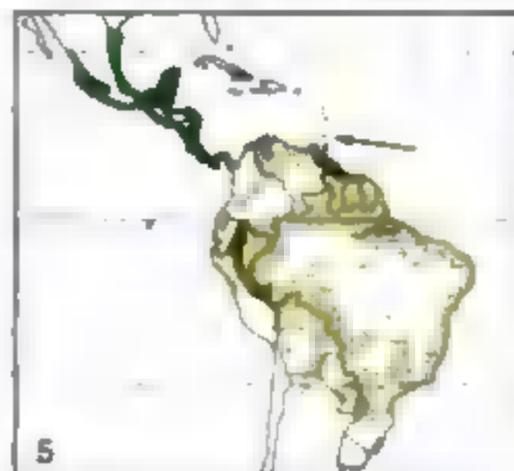
**15d Adult female** (*aquilonis*; Mexico) Black cap; rufous extends to cheeks.

**15e Dark adult** All slaty-black; one white tail-band. Flight (**15ex**).

**15f Juvenile** Rufous edges, white collar, 3 tail-bands; white below; eyes brown, face yellow. Flight (**15fx**).

**15g Dark juvenile** Blackish, edged buff; 2–3 tail-bands. Flight below (**15gx**): dark linings, barred remiges.

Text and map page 332





15ba

15b

## PLATE 13: NEW WORLD KITES II

### 14 Grey-headed Kite *Leptodon cayanensis*

L:43–53 cm (17 in); S:90–110 cm (36 in); T:21–26 cm (9 in); ♂:94%

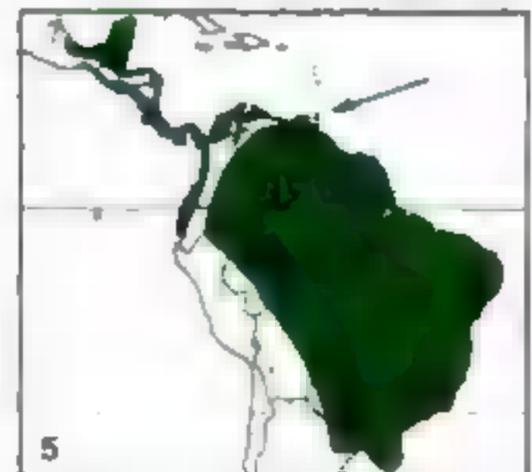
Humid forest edge, near water, to 1,000 m (3,300 ft). Largish kite; broad rounded wings, long rounded tail; wing-tips near tail-base. Flap-glide flight; usually soars low. Unobtrusive in canopy. Solitary. [cf. b234a/265, 151/213/245b; c31e–177c, 185d/186gh]

**14a Adult** Grey crown; nape and paler cheeks merge into grey-white underbody, slaty-black back/shoulders, obscure two-tone grey bars on wings; tail with white tip, 2 whitish bars, third on coverts; bare parts blue-grey. Flight below (**14ax**): white body contrasts black linings, banded quills. Above (**14ay**): pale head, obscurely barred wings, 3 thin bars on black tail.

**14b Pale juvenile** Head/underbody white but for dusky crown-patch and triangles behind eyes; brown above, edged rufous; broad grey-brown tail-bands, tip buff; bare plain creamy-white linings and basal part of secondaries; whitish remiges thinly barred, 2 dark tail-bars.

**14c Dark juvenile** All dark brown above, head sometimes (in S range) tinged rufous and with obscure collar; buffier below, more or less marked blackish; here almost solidly dark throat/breast. Flight below (**14cx**): more lightly marked bird with central throat-stripe, streaked breast, mottled thighs/wing-linings; secondaries browner than b, dark tail-bands often broader.

Text and map page 329



### 33 Plumbeous Kite *Ictinia plumbea*

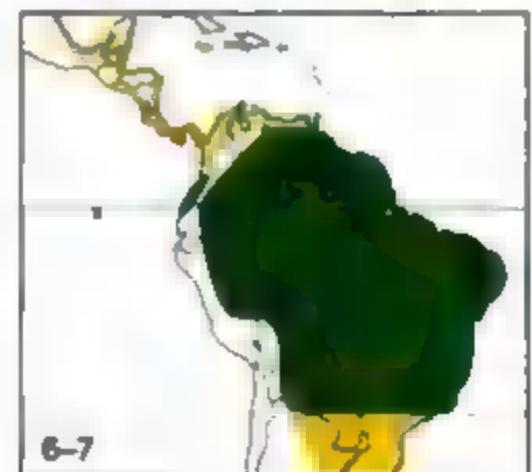
L:29–38 cm (11 in); S:70–85 cm (28 in); T:12–17 cm (5 in); ♂:95%

Riparian forest, wooded hills, mangroves, to 1,200 m (3,900 ft). Small kite very like 34; more pointed wings, squared tail, short legs; wing-tips well exceed tail. Solitary–small groups. [cf. 34]

**33a Adult** Grey head, paler crown and throat, blackish around red eyes; dark slate above, rufous on primaries; grey below; cere dusky, legs orange. Flight below (**33ax**): grey; pale throat; 2 white tail-bars; extensively rufous primaries. Above (**33ay**): dark; paler head; 2 broken tail-bars, rufous on primaries.

**33b Juvenile** Like 34b, but blacker above, edged buff; secondaries dark, slight rufous wash on inner webs of primaries; blacker streaks below. Flight below (**33bx**): pale greyish-rufous primaries speckled white at bases; 3 full white tail-bars.

Text and map page 369



### 34 Mississippi Kite *Ictinia mississippiensis*

L:31–37 cm (12 in); S:75–83 cm (30 in); T:15–17 cm (6 in); ♂:89%

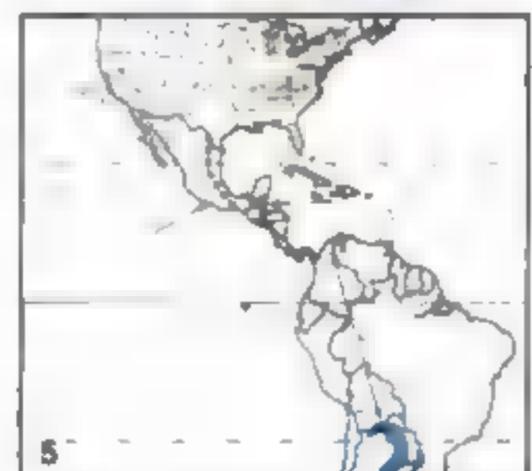
Riverine forest, parks, plains, to 1,200 m. Small falcon-like kite; long pointed wings, longish notched tail, short legs; wing-tips just exceed tail. Buoyant leisurely beats; glides on flat wings, ups upswept in soaring. Gregarious. [cf. 33]

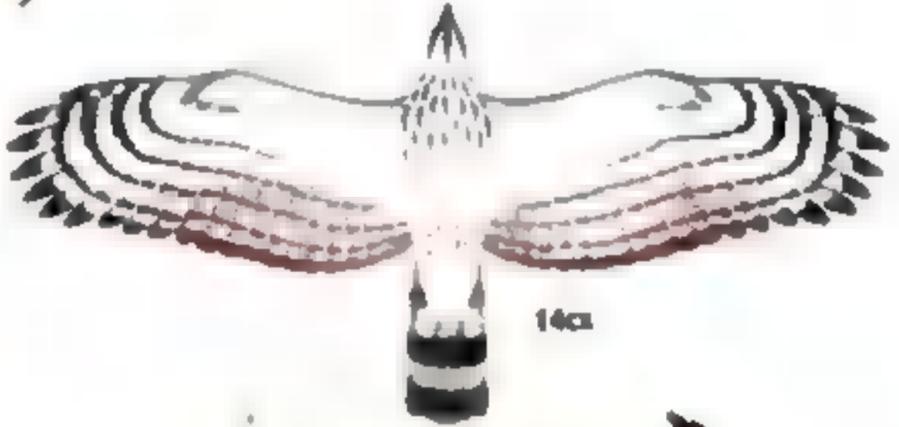
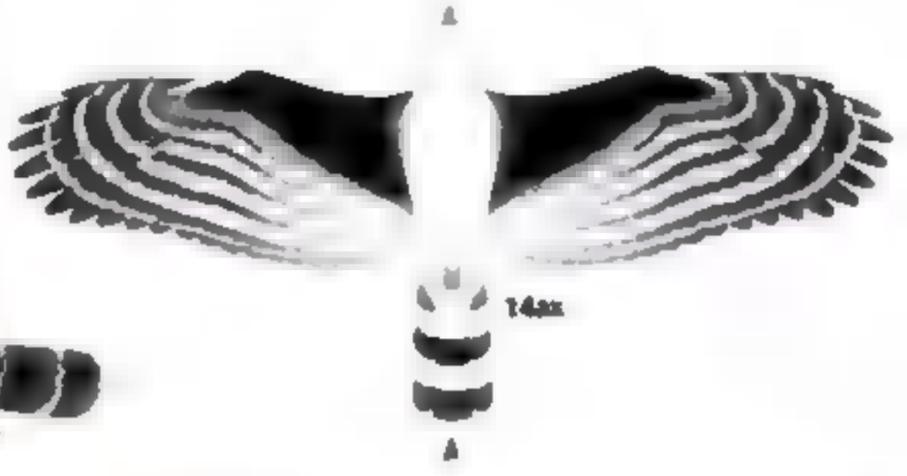
**34a Adult male** Whitish head, black around red eyes; slate-grey body, paler below; silvery secondaries, some rufous on primaries; black tail; legs orange. Adult female (**34ax**): grey head. Flight below (**34ay**; ad ♂): linings darker than body, whitestipped secondaries; faintly barred greyish-rufous patch on primaries; plain tail. Above (**34az**; ad ♂): silvery secondaries, some rufous on primaries.

**34b Juvenile** Dark brown above, edged rufous; whitish streaks on head, short buff supercilium; greyish secondaries, all remiges whitestipped; creamy below, streaked rufous; eyes brown. Flight below (**34bx**): streaked body, mottled wing-linings, white-based outer primaries, 3 incomplete pale tail-bands.

**34c First-year** Flight below. Body as a but for some white and brown spots of juvenile feathers; remiges/tail as b; eyes reddish.

Text and map page 370





## PLATE 14: NEW WORLD KITES III

### 21 Swallow-tailed Kite *Elanoides forficatus*

L52–62 cm (22 in): S119–136 cm (50 in): T28–37 cm (13 in): ♂93%

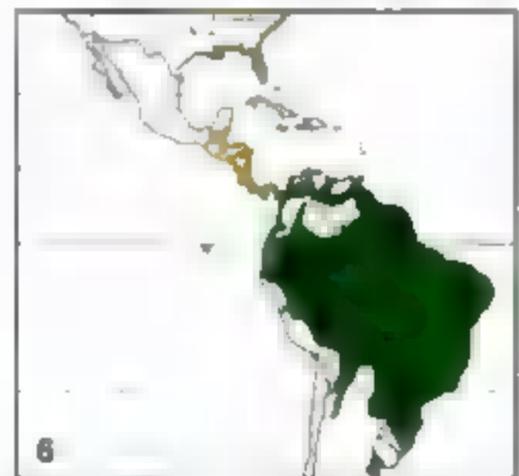
Wetlands, forest, savannah, to 1,800 m (wanders to 3,500+ m). Largish elegant kite; long pointed wings, long deep-forked tail; wing-tips exceed base of fork. Slow loose beats, skims water, rides air-currents, tail opening/closing/twisting; glides/soars on mainly flat wings. Social.

**21a Adult** (nominate; SE USA) Head/underparts white (also some tertials); back/wings/tail blue-black, glossed purple; eyes red, cere/legs blue-grey. Flight (**21ax**): shape/pattern.

**21b Adult** (*zetapa*; S Mexico/S America) In flight. Glossed green.

**21c Juvenile** Shorter tail; glossed green; white tips on wings wear off in first-year; sometimes dusky shaft-streaks on head/breast.

Text and map page 348



### 23 Pearl Kite *Gampsonyx swainsonii*

L20–25 cm (9 in): S45–55 cm (20 in): T8–12 cm (4 in): ♂91%

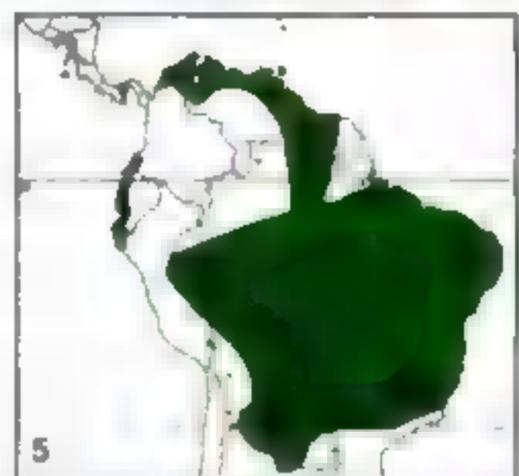
Palm savannah, scrub, woods, even towns, to 1,000+ m. Tiny falcon-like kite; pointed wings, roundish tail; wing-tips short of tail-tip. Dashing flight, fast beats; glides on flat wings; hovers briefly. Still-hunts. Confiding. [cf. 276 on size]

**23a Adult** (nominate; S from Amazon) Slaty-black and white; orange forehead/cheeks, white and chestnut collar, black (or rufous) patch on chest-sides, rufous thighs; eyes red, cere blue-grey. Flight below (**23ax**): white with cream wing-linings, palest grey remiges/tail. [Above: rear wing-edge boldly white.]

**23b Adult** (*leone*; Nicaragua to Amazon) Some rufous on flanks, too.

**23c Juvenile** Clearer collar; rufous edges above; flanks more rufous.

Text and map page 352



### 31 Double-toothed Kite *Harpagus bidentatus*

L29–35 cm (13 in): S60–72 cm (26 in): T13–17 cm (6 in): ♂88%

Forest, wooded savannah, to 1,200 m. Proportions and 'teeth' much as 32. Fast beats; glides. Not shy. [cf. 147–190; e32b]

**31a Adult male** (nominate; most range) Dusky grey-brown above with greyer head; whitish tail-bars; rufous below, lightly barred; throat (with dusky stripe) and crissum white; eyes orange, lores greenish.

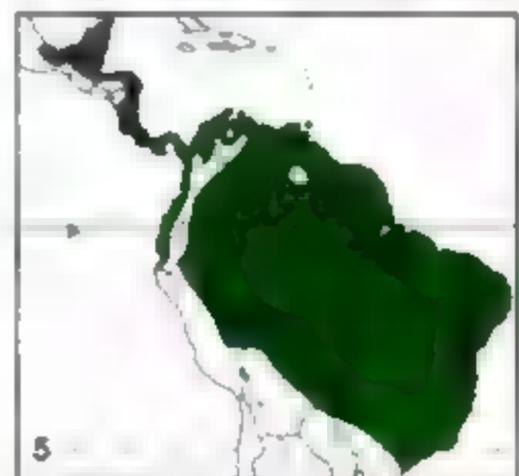
**31b Adult male** (*fasciatus*; S Mexico/W Ecuador) White below, variably washed rufous (some only on flanks or belly) and barred grey.

**31c Adult female** (nominate) Flight below. Rich rufous; creamy wings, banded remiges; clear whitish tail-bars; puffy tail-coverts.

**31d Adult female** (*fasciatus*) Broad rufous bars on abdomen; little grey.

**31e Juvenile male** (*fasciatus*) Brown above, thinly pale-edged; creamy-buff below, variably streaked; tinged rufous on flanks/thighs and more barred; throat-stripe. Flight (**31ex**): wing-linings as c.

Text and map page 366



### 32 Rufous-thighed Kite *Harpagus diodon*

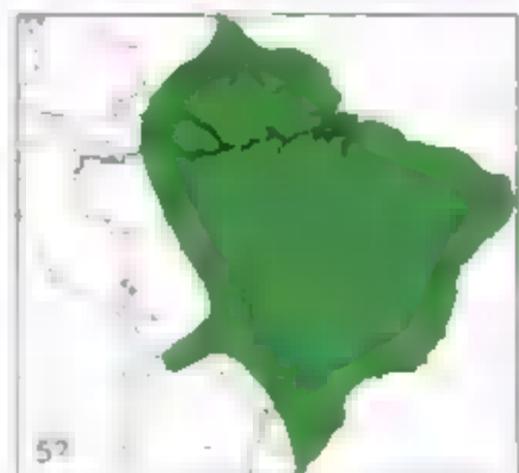
L29–35 cm (13 in): S60–70 cm (26 in): T13–17 cm (6 in): ♂87%

Forest, to 1,000 m. Small accipiter-like kite; short rounded wings pinched in at base, longish tail, short legs; 2 'teeth' on upper mandible; wing-tips only part down tail. [cf. 148di/31]

**32a Adult** Slate-grey above, head blackish; grey-white tail-bars and tail-tip; grey below, with throat-stripe, rufous thighs, white crissum; eyes red. Flight below (**32ax**): throat-stripe; grey body; rufous linings/thighs; black tail, pale bars (cf. 148d).

**32b Juvenile** Black-brown above; creamy below with throat-stripe, bold brown blotches on breast/belly (or, as shown by **32bx**, thinner drop-shaped streaks); thighs rufous, faintly barred. Flight below (**32bx**): here rufous-tinged linings thinly streaked.

Text and map page 368





## PLATE 15: INDO-AUSTRALASIAN KITES AND FISH-EAGLES

### 40 Whistling Kite *Haliastur sphenurus*

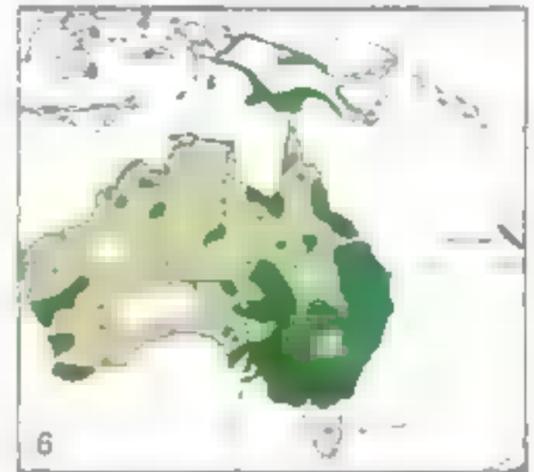
L51–59 cm (22 in): S120–146 cm (52 in): T23–29 cm (10 in): ♂79%

Coasts, wetlands, open woods/plains, often by water, to 1,400 m. Large untidy-looking kite; longish fingered wings, longish rounded tail; wing-tips short of tail-tip. Deep jerky beats; soars on arched wings; glides on flat wings, hands bowed, wrists forward. Scavenger; pirates raptors. Long descending whistle, then fast rising chatter. Solitary/gregarious. [cf. 231a/39/35b/41c]

**40a Adult** Brown, rufous and sandy, darker above and streaked below; paler head, darker remiges, grey tail; cere grey, feet cream. Flight below (**40ax**): pale streaky body linings; pale inner primaries, wing-diagonals and tail contrast blackish remiges.

**40b Juvenile** Darker, rustier, streakier; strongly pale-spotted above.

Text and map page 386



### 41 Brahminy Kite *Haliastur indus*

L44–52 cm (19 in): S110–125 cm (46 in): T18–22 cm (8 in): ♂86%

Coasts, wetlands, forest, lowlands but also to 3,000 m; industrial towns. Largish compact kite; broad rounded wings, shortish tail; wing-tips reach/exceed tail-tip. Glides on raised wings; soars in flat V. Peevish bleat *peeah*. Often gregarious. [cf. de40/42b/36b/231a]

**41a Adult** (nominate; SE Asia) White, with black shaft-streaks, and chestnut; black primaries. Flight below (**41ax**): white body, chestnut linings/crissum, rufous quills, all black wing-tips.

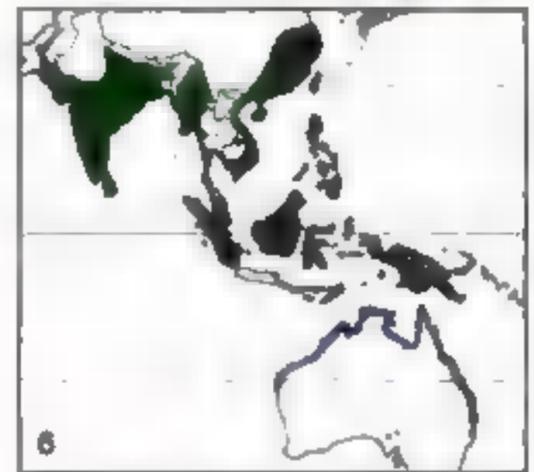
**41b Adult** (*giffenau*; Australasia) White parts pure, no streaks.

**41c Adult** (*flammaris*; Solomons) White also pure; bill all yellow.

**41d Juvenile** (nominate) Blackish above, spotted buff, fading to brown; more rufous and more streaked below and on cheeks/shoulders. Flight below (**41dx**): dusky linings; pale windows, black tips.

**41e Juvenile** (*giffenau*) In flight. Tail paler; abdomen dingy whitish.

Text and map page 387



### 43 Sanford's Fish-eagle *Haliaeetus sanfordi*

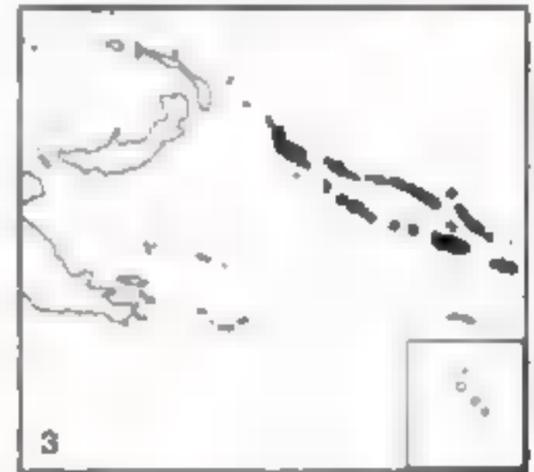
L70–85 cm (31 in): S165–185 cm (69 in): T25–28 cm (10 in): ♂90%

Forest, to 1,500+ m; also coasts, but less water-associated than congeners. Slim fish-eagle; long broad wings, wedged tail relatively longer than 42; wing-tips short of tail-tip. Glides and soars on shallow V wings. Feeds on phalangers and fruit-bats as well as fish. [cf. 41c; possibly vagrant 42b]

**43a Adult** Tawny head; brown to blackish back and wings, blacker tail; all dull rufous below; bill/cere greyish. Flight below (**43ax**): tawny head and rufous underbody clearly paler than rather uniformly dark underwings; pale tip to blackish tail.

**43b Juvenile** As 42b but tail dark with pale tip; throat darker ochre; much more clearly streaked below; crissum darker and mottled.

Text and map page 393



### 42 White-bellied Fish-eagle *Haliaeetus leucogaster*

L70–85 cm (31 in): S178–218 cm (78 in): T21–26 cm (9 in): ♂81%

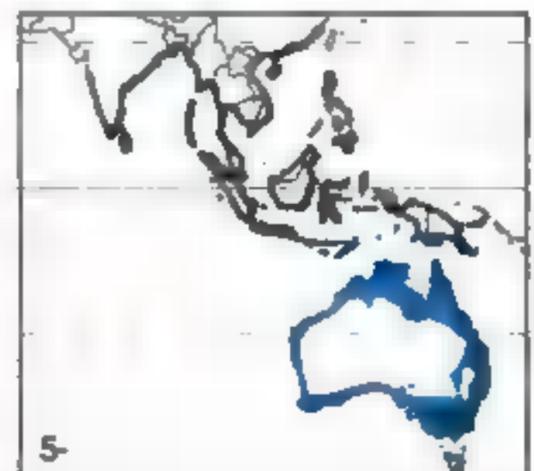
Coasts, rivers, lakes, to 900 m (1,500 m). Largish slender fish-eagle; long broad wings, shortish wedged tail; wings reach tail-tip. Glides; soars in stiff V. Snatches food from water; scavenges, pirates. Solitary/social. [cf. 46/48/225]

**42a Adult** White with grey back/wings/tail-base, blackish remiges; cere grey, feet cream. (Prev: yellow-bellied sea-snake *Pelamis platurus*.) Flight below (**42ax**): white; dark remiges/tail-base.

**42b Juvenile** Pale-tipped/streaked brown; white tail shading to broad brown tip; cere blue-grey, feet cream. Flight below (**42bx**): blotched linings, whitish diagonals/windows; dark tail-band.

**42c Second-year** In flight. Head/tail whiter; some rufous on chest/thighs; dark-tipped remiges/primary coverts; some **b** secondaries left.

Text and map page 390





DAVID MEAD

## PLATE 16: AFRO-MALAGASY FISH-EAGLES AND PALMNUT VULTURE

### 44 African Fish-eagle *Haliaeetus vocifer*

L63–75 cm (27 in); S175–210 cm (76 in); T19–24 cm (9 in); ♂82%

Rivers, lakes, coasts, to 4,000 m (mainly under 1,500 m); immatures wander well away. Mid-sized fish-eagle; long broad rounded wings, short rounded tail; wing-tips exceed tail-tip (not on longer-tailed juvenile). Slow beats; glides on flat wings, wrists forward; soars flat or in shallow V. Typical ringing *weeah kyoo-koo-koo* of African waters; pair often duets. [cf. bc8/52bc]

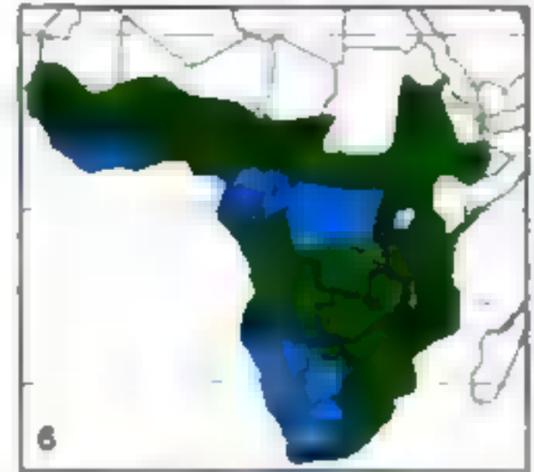
**44a Adult** White head to mantle/breast, and tail; black wings/rump; chestnut belly/shoulders; head flung back in characteristic call here. Pairs often perch together (**44ax**). Flight (**44ay**): white head/chest/tail; chestnut belly/linings; slaty remiges.

**44b Juvenile** Ragged, streaky; variably black-brown (♂s darker?); dark cap, pale cheeks; white breast-band, streaks on mantle/wings; off-white tail-base; cere/legs grey. Flight below (**44bx**): whitish breast-band, tail-base, wing-linings and windows.

**44c Second-year** Flight below. Whiter head/breast variably streaked dark; thinner dark tip to white tail; linings paler, windows white; few **b** secondaries. [Variable dark cap; cere pinkish.]

**44d Third-year** Flight below. Breast white with black streaks; belly and linings moulting black to chestnut; tail white or faintly dark-tipped; cere pinkish. [Head white, some brown on crown.]

Text and map page 394



### 45 Madagascar Fish-eagle *Haliaeetus vociferoides*

L60–66 cm (25 in); S165–180 cm (68 in); T23–30 cm (10 in); ♂82%

Coastal mangroves, lakes, cliffs. Slightly smaller than **44**; relatively shorter wings, longer tail and legs. Loud call.

**45a Adult** Grey-white crown, nape and throat, streaked rufous and brown; white cheeks; white tail with thin blackish shafts; otherwise dark brown, variably streaked rufous on mantle, breast and wings; remiges greyer; cere/legs whitish. Flight (**45ax**): looks dark with whitish head and white tail, but wing-linings as body, dark grey remiges, pale primary bases.

**45b Juvenile** Paler brown than **44b**, and more evenly streaked whitish above, mottled yellow-buff to whitish below; rufous throat; blackish remiges and grey-brown tail, all edged whitish.

Text and map page 396



### 52 Palmnut Vulture *Gypohierax angolensis*

L57–65 cm (23 in); S135–155 cm (57 in); T19–21 cm (8 in); ♂92%

Forest, mangroves, wooded savannahs, to 1,500 m (1,800 m), near food palms and water. Small *Haliaeetus*-like vulture; short broad wings, short rounded tail; well projecting head, bare face, strong bill; wing-tips almost cover tail-tip. Fast flaps/glides; soars high. Arboreal; also forages on ground, takes fish. Often solitary. [cf. 54–55; bc44bc/70/89b/eagles]

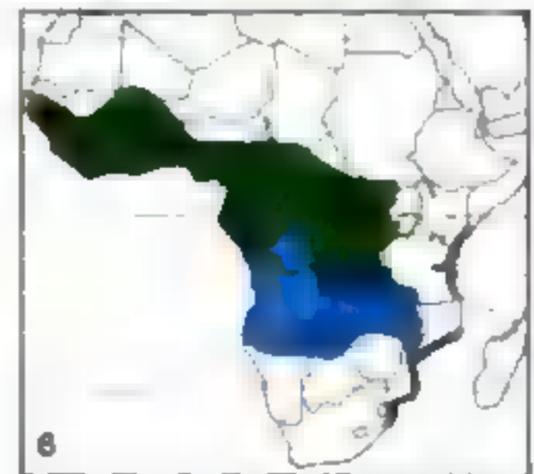
**52a Adult** Much white; black scapulars/secondaries/larger coverts; cere blue, face orange-red, legs dull orange. (Food fruit of oil palm *Elaeis guineensis*.) Flight (**52ax**): black-tipped white primaries, black secondaries/primary coverts; tail-base.

**52b Juvenile** Brown, back, remiges; tail darkest, head/shoulders/rump palest; face, cere yellow-grey, legs whitish. Flight below (**52bx**): paler head/axillaries/wing-diagonals; dark primaries.

**52c Second-year** Flight below. Dusky secondaries, pale windows and white-tipped tail show pattern emerging as **a** (cf. also **44c**).

**52d Fourth/fifth-year** Head, body and coverts patchy (not streaky as **44cd**) or largely white; face flesh to yellow, legs whitish-yellow.

Text and map page 411





## PLATE 17: NEARCTIC AND PALEARCTIC FISH-EAGLES

### 47 Bald Eagle *Haliaeetus leucocephalus*

Text and map page 400

L:70–90 cm (31 in); S:180–230 cm (81 in); T:23–37 cm (12 in); ♂:76%

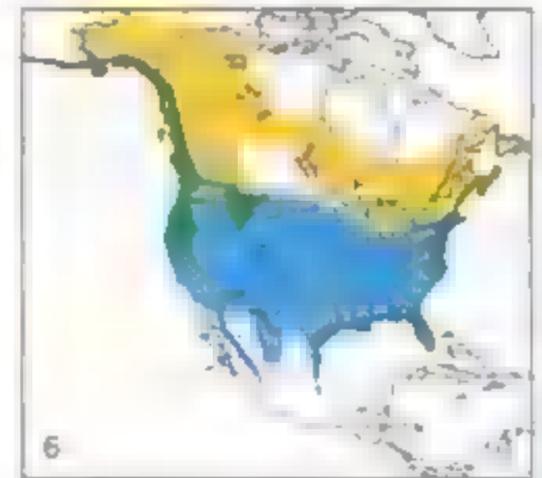
Coasts, lakes, rivers, to 2,000 m. Large fish-eagle (larger in N); neck shorter, tail longer—less wedged than 48; wing-tips short of tail-tip. Glides on flat wings, wrists forward; soars flat or in slight V. Often gregarious. [cf. bc-18bc (224); d8]

**47a Adult** Dark brown body—wings, edged paler; white head—tail plus coverts; may have few dark spots on head; bill oranges-yellow. Flight below (47ax) and above (47ay): white head—tail—rump.

**47b Juvenile** Head dark; back, wing-coverts and belly paler tawny; sometimes white streaks below; tail with whitish base or all dark; bill black. Flight below (47bx): whitish axillaries and diagonals; wings/tail longer than a; trailing edges serrated.

**47c Second/third-year** Flight below. Belly white, variably dark-streaked; tail as b but shorter; new dark-tipped whitish secondaries shorter and some b secondaries left, so trailing edge uneven. [Above: inverted triangle on back and some coverts whitish.]

**47d Fifth/sixth-year** Flight below. Head whiter, body darker; axillaries white, diagonals fading; tail variable. Close-up 4–5-yr head (47dx): Osprey pattern with dark eye-stripe; eyes/bill now yellowish.



### 48 White-tailed Fish-eagle *Haliaeetus albicilla*

Text and map page 402

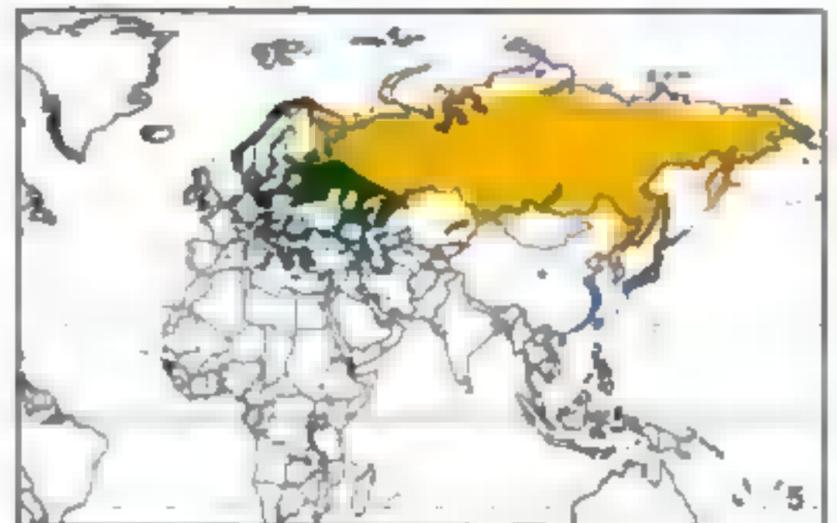
L:74–92 cm (33 in); S:193–211 cm (86 in); T:23–31 cm (11 in); ♂:77%

Coasts, lakes, rivers, to 2,000 m (mostly lower). Large bulky fish-eagle, long rectangular wings, neck heavy bill protrude as far as short wedge-tail; wing-tips reach tail-tip. Still shallow beats; glides/soars on flat or slightly bowed wings. Often solitary; immatures social. [cf. bc-16 (47–49); 63–64 (218–219–221–222–224)]

**48a Adult** Mostly brown, scaled paler, looking ragged; streaky bill to creamy head—neck merging into brown chest and, in turn, darker belly—thighs; white tail; bill yellow. Flight below (48ax): white tail, pale head—chest. Above (48ay): white tail but dark rump; scaled back—wing-coverts paler than remiges.

**48b Juvenile** Dark head—remiges—thighs, mottled tail; rest red-brown, tipped blackish above, heavily streaked below, throat paler; bill blackish. Flight below (48bx): streaked body; whitish axillaries and wing-diagonals; mottled inner secondaries; longer and less wedged tail with whitish-centred feathers.

**48c Third-year** Flight below. Mottled brown—white; tail shorter—more contrasted than b; some b secondaries left; bill yellowish.



### 49 Steller's Fish-eagle *Haliaeetus pelagicus*

Text and map page 406

L:85–105 cm (37 in); S:195–230 cm (84 in); T:32–36 cm (13 in); ♂:82%

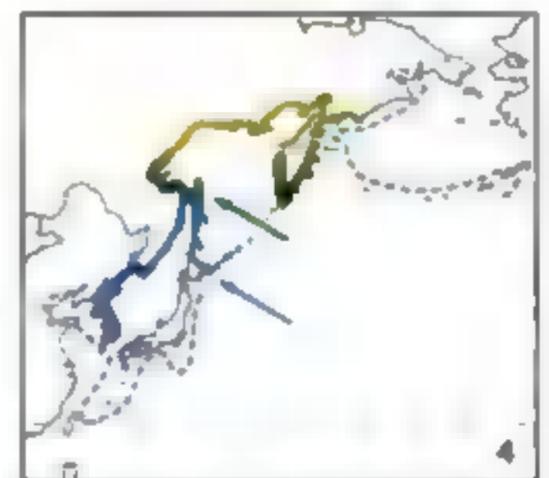
Rocky coasts, coastal rivers. Huge fish-eagle; paddle-shaped wings, longish wedged tail, massive bill; wing-tips well short of tail-tip. Often solitary; social in winter. [cf. 17–48 (224)]

**49a Adult** Blackish, with white forehead, shoulders, thighs, tail, and all tail-coverts above and below; greyish streaks on crown/neck; face bill—legs oranges-yellow. Flight below (49ax) and above (49ay): blackish with white forewings, white tail.

**49b Dark adult ('niger'; Korea)** All black but for white tail; rare (extinct?).

**49c Juvenile** Blackish with grey streaks on head—chest, white-mottled median coverts—inner secondaries, dark-tipped whitish tail; face, bill, legs yellow. Flight below (49cx): pale mottling on chest, axillaries and wing-linings; whitish-based remiges; darker-ended whitish tail (with rounder wedge-tip than a).

**49d Third-year** Flight below. Whiter-mottled wing-linings, neck, and thighs; windows on blacker remiges; dark-mottled white tail.



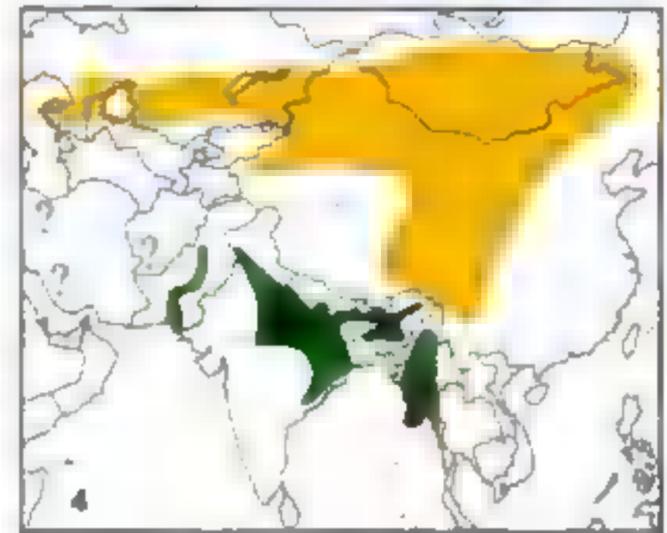


## PLATE 18: ASIAN FISH- AND FISHING-EAGLES

### 46 Pallas's Fish-eagle *Haliaeetus leucoryphus*

Text and map page 398

L72–84 cm (31 in); S185–215 cm (79 in); T25–30 cm (11 in); ♂81%  
Inland seas, lakes, rivers, to 5,200 m. Large slim fish-eagle; long broad wings, squarish tail, longish neck, smallish bill; wing-tips short of tail-tip. Faster lighter beats than 48; glides/soars on flat wings. Gregarious/solitary. [cf. 51/bc48bc/aquilas]



**46a Adult** Brown, darkest on shoulders/back and more rufous below; pale head, broad white tail-band; tawny crown/mantle and whiter face tinged rufous when fresh; cere grey, feet flesh to white. Flight below (**46ax**): whitish head, white tail-band; dark wings, slightly paler diagonals. Above (**46ay**): pale head to V on mantle, white tail-band; grey-based outer primaries.

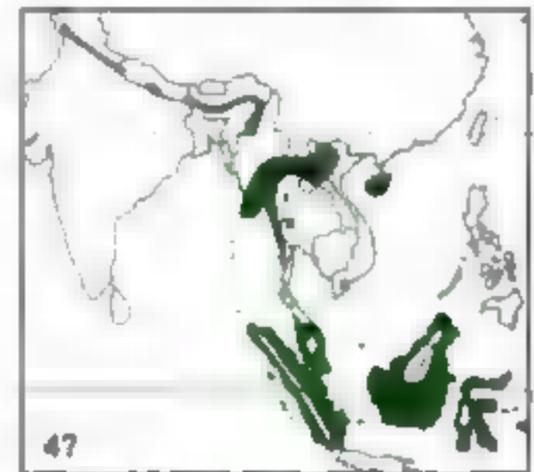
**46b Juvenile** Brown above, edged buff or light brown; dark head; paler below with tawny breast; cere grey, legs dull whitish. Flight below (**46bx**): brown body and darker tail; whitish axillaries; pale brownish-buff wing-diagonals on dark-mottled linings; brown remiges with well-defined whitish windows; carpal arcs.

**46c Fourth-year** Flight below. Less contrast now on underwings; mottled tail-band and whitish base. Close-up of head (**46cx**): paler than **b**; dark mask contrasting buff throat. [Adult by c5/6-yr.]

### 50 Lesser Fishing-eagle *Ichthyophaga humilis*

Text and map page 408

L55–68 cm (24 in); S120–165 cm (56 in); T18–25 cm (8 in); ♂74%  
Fast-flowing forest waterways, to 2,500+ m. Small fishing-eagle; broad wings not especially long, rounded tail; wing-tips well short of tail-tip. Faster beats than 51; glides/soars on flat wings. Swoops on fish from mid-stream rocks. Solitary. [cf. 51]



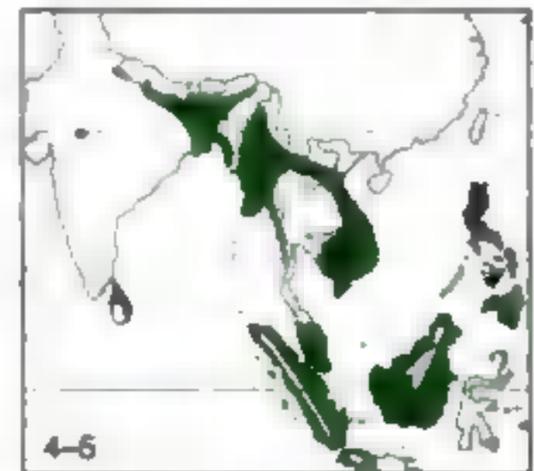
**50a Adult** Brownish but for greyer head/neck with fine dark streaks, white belly/thighs; uppertail rather uniform; eyes yellow, cere brown, legs whitish. Flight below (**50ax**): white abdomen; greyish tail variably speckled, giving greater/lesser contrast with dark tip; often pale primary-flashes (cf. 51). Above (**50ay**): brownish; darker remiges.

**50b Juvenile** Paler brown, streaked on head/breast; belly/thighs white as **a**; whitish leather-bases show on hack/wings; eyes brown. Flight below (**50bx**): far paler; wing-linings mottled; lightly barred remiges dark-tipped; diffuse tail-band, whitish base.

### 51 Grey-headed Fishing-eagle *Ichthyophaga ichthyactis*

Text and map page 410

L66–77 cm (28 in); S140–175 cm (62 in); T23–28 cm (10 in); ♂75%  
Rivers, lakes, irrigation tanks, in wooded country, to 1,000 m; also coastal lagoons, estuaries. Mid-sized fish-eagle; shape as smaller 50. Deep beats less heavy than *Haliaeetus*; glides/soars on flattish wings. Solitary. Swoops from perch to take fish at surface. Laughing screams. [cf. 50/46/b42b]



**51a Adult** Brown with grey head/neck; more rufous below; white belly and thighs; white tail with broad dark subterminal band; eyes yellow, cere dark grey, legs whitish. Flight below (**51ax**): white abdomen/tail-base, plain brown wings (cf. smaller 50). Above (**51ay**): dark; paler head; contrasting white tail-base.

**51b Juvenile** Head/neck/breast bolder-streaked than 50b; dark brown above, edged grey; whitish tail with brown-speckled bars; white thighs also mottled brown; eyes brown. Flight below (**51bx**): much paler than **a** or 50b; streaked axillaries and body darker than mottled wing-linings, mid-wings largely white; speckly bars on mottled tail, no clear subterminal.

**51c Second(third?) year** Flight below. Less streaked breast, darker wings, clearer tail-band, whiter belly/thighs, so more like 50b.



## PLATE 19: LAMMERGEIER AND SMALL OLD WORLD VULTURES

### 53 Lammergeier *Gypaetus barbatus*

Text and map page 413

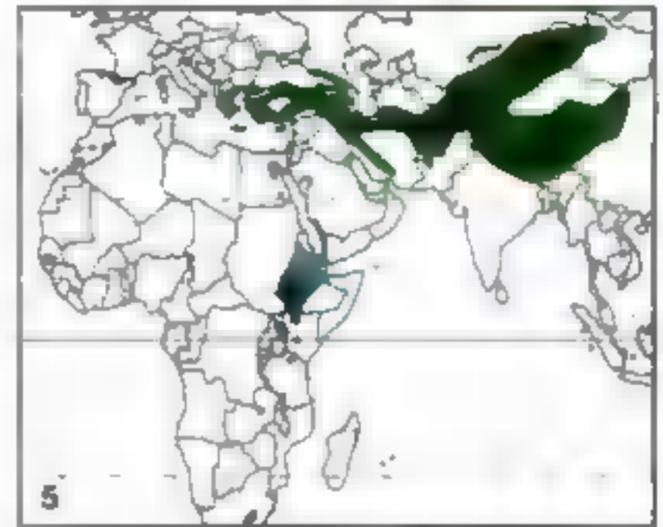
L94–125 cm (43 in): S231–283 cm (101 in): T43–52 cm (19 in): ♂97%  
Mountains, upland steppes, 1,000–4,500 m (3,000–7,500 m). Huge slender vulture; long narrow pointed wings, long broad diamond-shaped tail; wing-tips well short of tail-tip. Soars with wings flat or hands lowered, glides slightly bowed. Solitary. [cf. 53c; see 54c]

**53a Adult** (*aureus*; Eurasia) Cream head, black mask/beard/streaks; grey-black above, whitish shaft-streaks; orange-buff below, broken black gorget. Flight below (**53ax**): cream-orange body; black wing-linings; slate-grey remiges black-tipped.

**53b Adult** (*meridionalis*; E. S. Africa) Smaller than **a**; no streaks on head, no broken gorget. [Also, bottom 4–5 cm of tarsus bare.]

**53c Juvenile** All darker: black head/neck (short beard not obvious); blackish above, spotted buff-white; grey-brown below. Flight below (**53cx**): grey-brown body and wing-linings somewhat paler than black head and blackish quills. (Longer secondaries and often abraded tail can make shape less distinctive.)

**53d Third-year** Flight below. Body now blackish-mottled rusty-cream.



### 54 Egyptian Vulture *Neophron percnopterus*

Text and map page 417

L54–66 cm (24 in): S146–175 cm (63 in): T25–26 cm (10 in): ♂98%  
Plains, deserts, coasts, towns, mountains, to 2,500 m (3,600 m). Small slight vulture; long wings, wedged tail, small head, shaggy ruff, thin bill; wing-tips reach tail-tip. Deep beats, flaps more than larger vultures; glides/soars with wings flat or hands dropped. Often solitary. [cf. ab230ab/c55/cd53cd/52b-d/218–221]

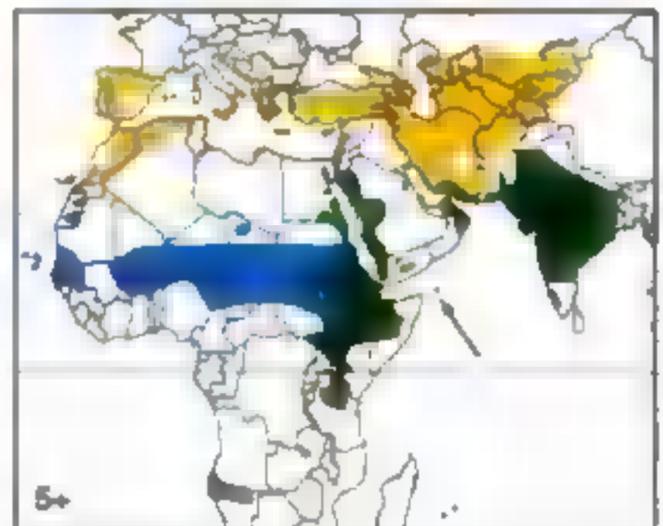
**54a Adult** (nominate; Afr/Pal) Mainly white with black remiges; often variably stained rusty-pink, buff, grey or brown; eyes brown to red, bare face yellow-orange, bill mainly black, legs flesh to yellow. Dropping stone on egg of Ostrich (**54ax**). Flight below (**54ay**): body/forewings/tail white, remiges black. Above (**54az**): cream, grey on outer webs.

**54b Adult** (*ginginianus*; India) 5% smaller; bill mainly yellow.

**54c Juvenile** Dark brown with blacker head, variable cream-buff tips; eyes, bill brown, bare face grey. Flight below (**54cx**): dark with paler head, whitish-tipped grey-brown tail. Above (**54cy**): back, coverts, remiges and tail edged cream-buff.

**54d Second-year** More mottled as, increasingly, some white feathers appear on body and wing-coverts; bare face already yellow.

**54e Fourth-year** More as **a**, but whites tinged buff, some brown feathers.



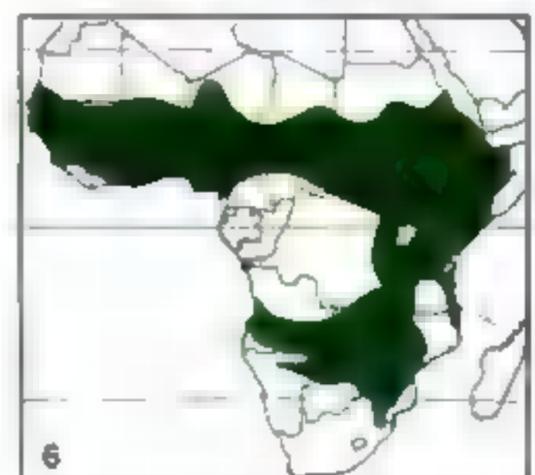
### 55 Hooded Vulture *Necrosyrtes monachus*

Text and map page 421

L54–66 cm (24 in): S150–180 cm (65 in): T21–24 cm (9 in): ♂95%  
Savannah, coastal towns, forest villages, to 1,800 m (4,000 m). Resembles small ragged/pale-headed **54c**; thin bill, broader wings, shorter rounded tail, bare head, untidy ruff; wing-tips cover tail. Easy flaps; soars/glides on flat wings, looking like tiny **64**. Gregarious near man. [cf. 54c/64/52b]

**55a Adult** Dark brown, quills blacker; hood of silver-brown down over hindneck shades to white at sides; crop cream-buff; bare face/foreneck pink, blushing red when excited (**55ax**). Flight below (**55ay**): pale-edged secondaries/greater coverts, but main contrasts are pale head area, white underdown on thighs, whitish legs. Above (**55az**): all dark but for paler head.

**55b Juvenile** Scaled buff above; blackish down on hindneck; thighs and crop area blackish; face/throat grey-white, just tinged pink.





53b

53ax

53a

53cx

53c

53d

54ax

54az

54ay

54cx

54b

54d

54e

54cy

54a

54c

55ax

55b

55ay

55a

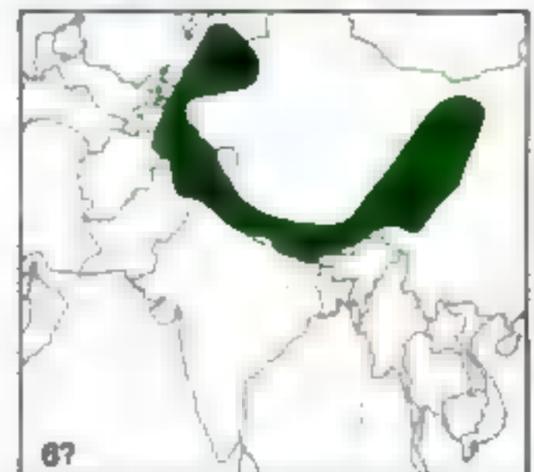
55az

## PLATE 20: LARGER OLD WORLD VULTURES

### 60 Himalayan Vulture *Gyps himalayensis*

Text and map page 430

L103–110 cm (42 in): S260–289 cm (108 in): T37–40 cm (15 in): ♂100%  
Mountains 1,200–2,500 m, foraging 600–6,000+ m. Largest griffon vulture; long broad wings, bulging secondaries, relatively long tail; downy head/neck, feathery basal ruff. Slow deep beats on take-off; glides on flat wings, hands depressed and angled back; soars in shallow V. Solitary/social. [cf. 61/63/58/56b]



**60a Adult** Palest tawny to sandy-white above; ruff/underbody cream to buff with white shafts; blackish tail, remiges, centres to greater coverts; stubby head cream; bill yellow-horn, cere brownish, feet green-grey to white. Flight above (**60ax**): pale back/forewings; blackish quills/blotches on greater coverts.

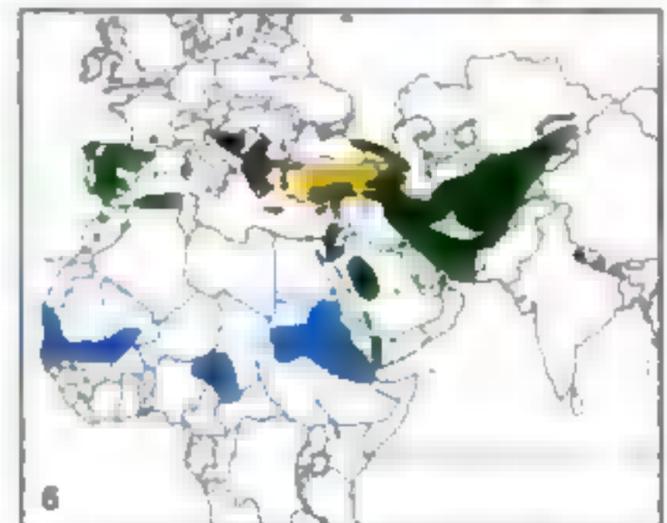
**60b Juvenile** Dark brown, with whitish streaks most marked on ruff, wing-coverts, and more chocolate underparts; head whiter than a, wings blacker in fresh plumage. Flight below (**60bx**): much darker than **61b** (less contrast with remiges, tail) and boldly streaked (this and white around crop separate from **63**).

**60c Fourth-year** Flight below. Body/coverts increasingly paler until ad by c7th-year. Quills black when fresh, fading to brown.

### 61 Griffon Vulture *Gyps fulvus*

Text and map page 431

L93–110 cm (40 in): S234–269 cm (99 in): T28–33 cm (12 in): ♂92%  
Mountains to 3,000 m, foraging plains and desert to 3,500+ m. Large bulky vulture; long broad wings, bulging secondaries, short rounded tail (squared/wedged by wear); bare-looking head/neck, basal ruff. Deep beats; glides with arms flat, dropped hands angled back; soars in shallow V. Solitary/gregarious. [cf. 58/60/56b/63/64/218–224]



**61a Adult** (n nominate) Pale tawny to cream-buff; blackish quills, centres to greater coverts/scapulars; stubby head creamy (lores black); thick downy ruff white when clean; bill yellowish, cere slate, feet grey. Flight above (**61ax**): pale back/forewings; dark quills, blotches on scapulars/coverts.

**61b Adult** (*fulvescens*, Afghanistan, N India) Often paler-looking; generally more rufous-buff to cinnamon; ruff creamy-yellow.

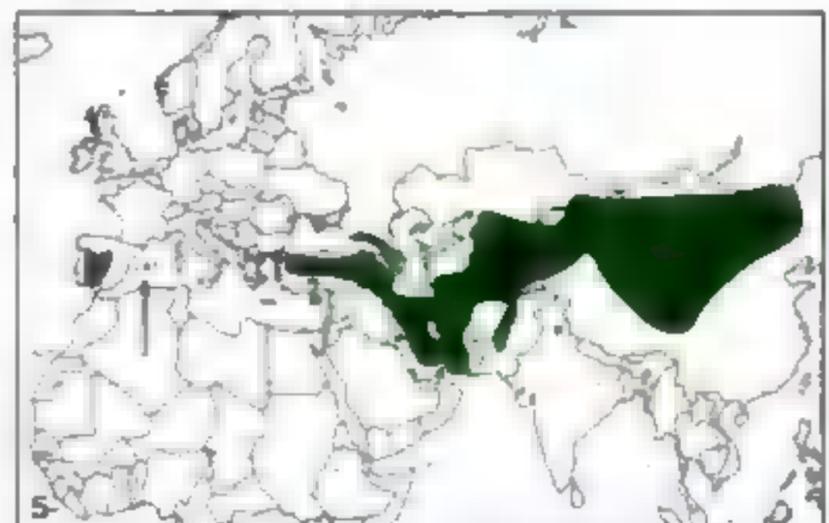
**61c Juvenile** (n nominate) Pale rufous-brown with light streaks; dark greater coverts; downy head white (lores, too), feathery ruff sandy-buff. Flight below (**61cx**): pale red-brown and blackish.

**61d Fourth-year** (n nominate) Flight below. Body/coverts become tawnier until ad by c7th-year. Quills black when newly moulted, fading to brown.

### 63 Monk Vulture *Aegypius monachus*

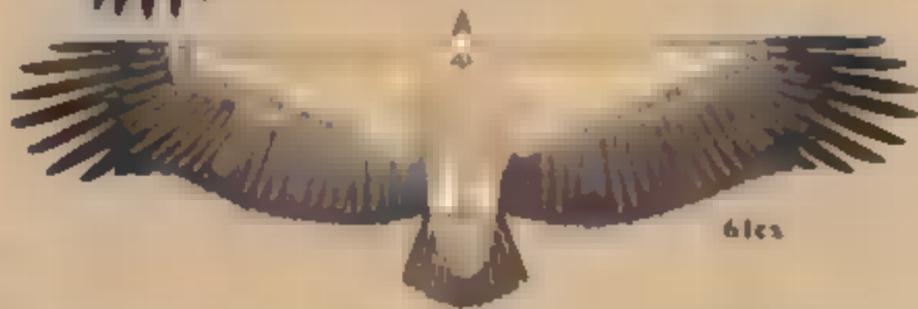
Text and map page 437

L100–120 cm (43 in): S250–295 cm (107 in): T33–41 cm (13 in): ♂93%  
Grassland, semi-desert, open forest, mountains, to 3,800 m (4,300 m). Largest Old World vulture; long parallel-edged wings, short wedged tail (rounded by wear); massive bill, downy head, shortish neck, feathery ruff high-backed. Deep beats; glides/soars on flat wings, hands dropped/angled back when gliding. Often solitary. [cf. 56b, 60b/64; also 222/48b]



**63a Adult** Dark brown, ruff too; thighs/quills blacker; down on face/throat blackish, on crown/cheeks grey-white; bare neck grey-flesh/blue-white; cere mauve to bluish, feet blue-grey to yellow-white. Flight below (**63ax**: worn plumage): grey-brown around crop, pale wing-diagonal and feet. Above (**63ay**): only crown paler.

**63b Juvenile** Blacker all over; down on crown/cheeks also blackish; cere whitish, legs pinkish-grey to yellowish. Flight below (**63bx**): all sooty-black; barely lighter remiges, pale feet.



## PLATE 21: MID-SIZED INDOMALAYAN VULTURES

### 66 Red-headed Vulture *Aegypius calvus*

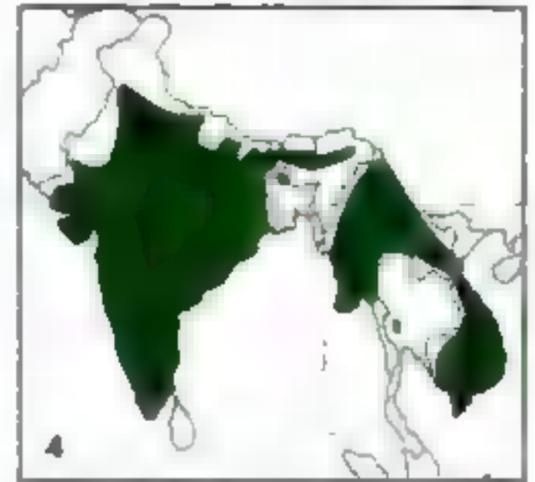
L76–86 cm (32 in): S199–227 cm (84 in): T23–26 cm (10 in): ♂98%

Forest, plains, cultivation, semi-desert, to 2000 m. Bulky mid-sized vulture; long and relatively slim wings rather pointed; short tail slightly wedged (rounded by wear); heavy bill, bare wattled head, feathery ruff. Powerful beats on take-off; soars in shallow V. Often singly, or with 56/58.

**66a Adult** Mainly black, ruff also; browner on lower back/bases of secondaries, white patches on chest and upper thighs; bare head/wattles orange, reddening in excitement (**66ax**); eyes yellow to red, cere yellow-red, legs flesh-white to dull red. Flight below (**66ay**): black body/wing-linings, grey-white diagonals at base of remiges; white chest/thigh-patches; reddish head/feet.

**66b Juvenile** Brown, edged paler above; whitish chest-patch, lower flanks, belly, tail-coverts, and down on crown; eyes brown, head/wattles/cere/legs paler reddish. Flight below (**66bx**): brown; thin wing-diagonals; whitish on belly/crisum.

Text and map page 443



### 58 Long-billed Vulture *Gyps indicus*

L81–103 cm (36 in): S196–258 cm (89 in): T24–31 cm (11 in): ♂96%

Plains, cultivation, semidesert, foothills, to 2,000 m. Bulky medium-large vulture; long broad wings, bulging secondaries, short rounded tail (squared-wedged by wear); relatively thin bill, patchily downy or bare head, basal ruff. Glides on flat wings, hands dropped, angled back; soars in shallow V. **a** and **b** sometimes considered distinct species. Gregarious. [cf. 61/60; c56b]

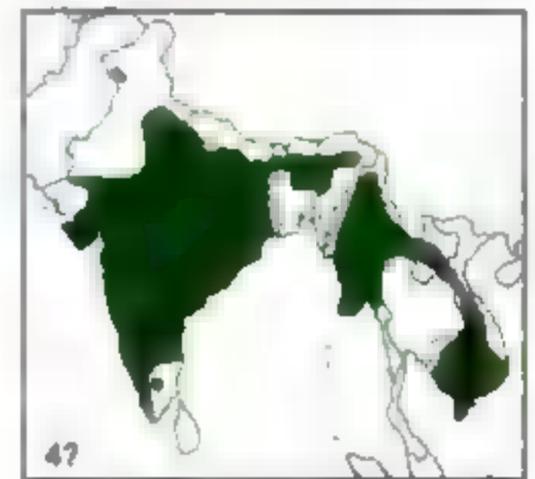
**58a Adult** (nominate; peninsular India) Pale buff above, sandy below; blackish quills; patchy whitish down on grey head/neck; downy white ruff; bill green-brown, cere greyer, legs slate. Flight below (**58ax**): pale body and wing-linings, darker axillaries; blackish primaries/tail, browner secondaries; dark head/crop.

**58b Adult** (*tenuirostris*; N India, SE Asia) Slightly darker, browner above; almost no down on bare shiny head/neck; thinner bill.

**58c Juvenile** (nominate) Brown, streaked buff above and creamy below; more down on head/neck; brown feathery ruff; thinner-billed, paler, than **56b**. Flight below (**58cx**): much paler than **56b**; even primary coverts sometimes creamy; abdomen less streaked.

**58d Third-year+** Flight below. Intermediate plumage. [Adult by c6/7-yr.]

Text and map page 426



### 56 White-rumped Vulture *Gyps bengalensis*

L75–85 cm (31 in): S192–213 cm (80 in): T22–24 cm (9 in): ♂98%

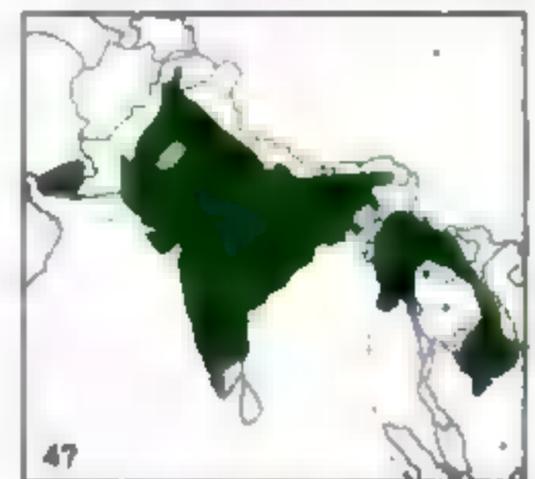
Open country like 58 (often together), also more wooded areas and up to 2,700 m; typically, riverine and village trees. Size comparable, shape/actions similar, but arms relatively longer and tail shorter. Gregarious. [cf. dark-rumped immatures with 58c/61c]

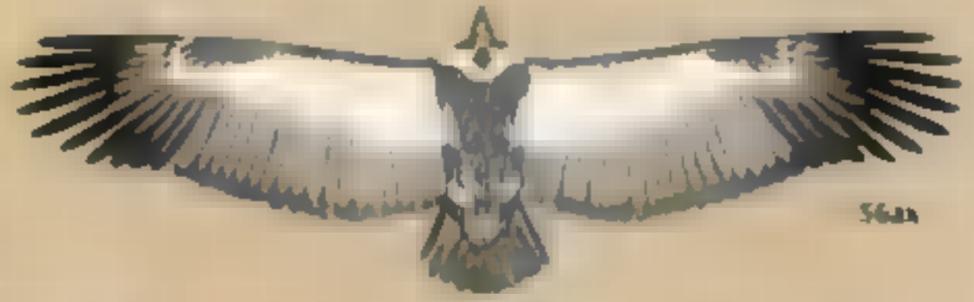
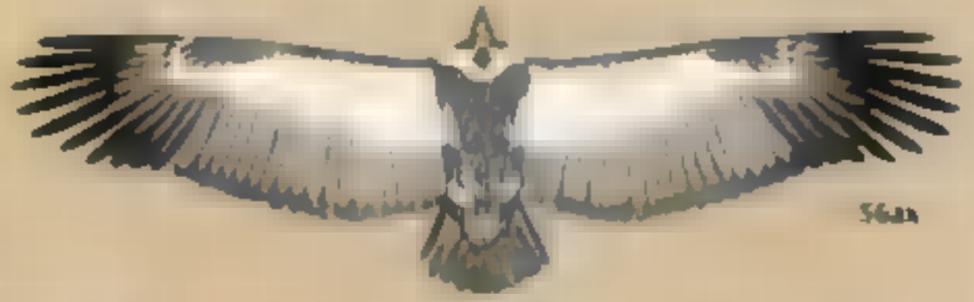
**56a Adult** Blackish-slate with white rump, grey secondaries, fine pale streaks on breast/belly; sparse white to dirty cream down on upper-side of grey head/neck; thick downy white (or soiled) ruff; bill whitish, cere black, legs green-grey/blackish. Flight below (**56ax**): white wing-linings; blackish leading edges, primaries, axillaries, body, tail; secondaries grey-brown.

**56b Juvenile** Dark brown (rump, too), warmer below, all streaked buff; more whitish-buff down on head/neck; buff feathery ruff; heavier-billed, darker than 58c. Flight below (**56bx**): less contrast than 61c; darker crop-patch/wing-linings, streakier abdomen than 58c; white/cream bar(s) near front wing-edges.

**56c Fourth-year+** White rump; mixed blackish plumage. [Adult by c6/7-yr.]

Text and map page 422





## PLATE 22: LARGER AFROTROPICAL VULTURES I

### 57 White-backed Vulture *Gyps africanus*

L78–90 cm (33 in): S197–229 cm (84 in): T24–28 cm (10 in): ♂96%

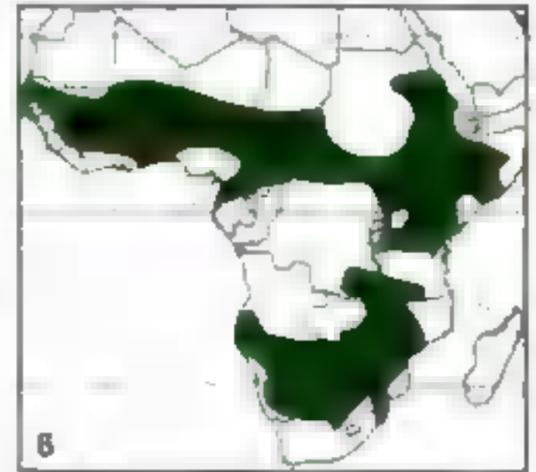
Plains, savannah, thornbush, riverine trees, to 3,000m (4,000 m). Mid-sized vulture; long broad wings, bulging secondaries, short rounded tail (squared by wear); bare-looking head/neck, basal ruff. Deep beats; glides on flat wings, hands dropped and angled back; soars in shallow V. Gregarious. [b59cd/62/61]

**57a Adult** Rather uniform brown to buff (even creamy when old); white rump; blackish quills/greater coverts; sparse whitish down on upper-side of blackish head/neck; downy white (or soiled) ruff; bill, cere and legs blackish. Flight below (**57ax**): whitish body/wing-linings, blackish remiges/tail.

**57b Juvenile** Darker; narrow white streaks on brown rump, coverts, feathery ruff, underparts; thick white down on head/neck but bare green-black face; smaller, shorter-billed, paler than **59c**. Flight below (**57bx**): dark body/wing-linings finely streaked white, whitish band near leading edge; black quills.

**57c Fourth-year+** Little change before 4-yr but paler, less streaked; rump and wing-linings whiten over next 3 years. [Adult by c7-yr.]

Text and map page 425



### 59 Rüppell's Vulture *Gyps rueppellii*

L85–97 cm (36 in): S226–255 cm (95 in): T26–30 cm (11 in): ♂98%

Mountains to 4,500+ m, also thornbush/savannah/semi-desert near crags/cliffs. Largish vulture; like slightly larger **61** and smaller **57**, but more compact with snaky neck. Notably, soars on flat or slightly raised wings. Gregarious. [cd57b/61; cf. 64]

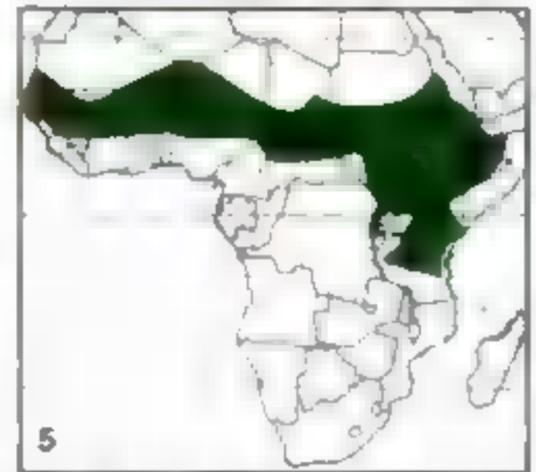
**59a Adult** (nominate; most of range) Brownish-black (tinged grey when fresh), boldly cream-scaled; plainer mantle, blackish quills; downy white head/neck; white feathery ruff; eyes yellowish to grey, bill yellow, cere, feet grey-blue. Flight below (**59ax**): scaled body, cream band and 2–3 broken bars on wing-linings.

**59b Adult** (*erlangeri*, Ethiopia–Somalia) Browner; broader scaling less sharp; below, dark-spotted creamy body paler than wings.

**59c Juvenile** (nominate) Dark brown above (ruff, too), only faintly scaled; tawny below, pale-streaked; down on top of head brownish; eyes/bill browner. Flight below (**59cx**): very like **57bx**, but streaked body paler (not darker) than wing-linings with clearer streaks forming 3–4 lines behind front band.

**59d Juvenile** (*erlangeri*) Flight below. More uniformly pale, recalling small **61cx** but with somewhat darker wing-linings, dark crop area.

Text and map page 428



### 62 Cape Vulture *Gyps coprotheres*

L95–105 cm (39 in): S228–250 cm (94 in): T30–35 cm (13 in): ♂98%

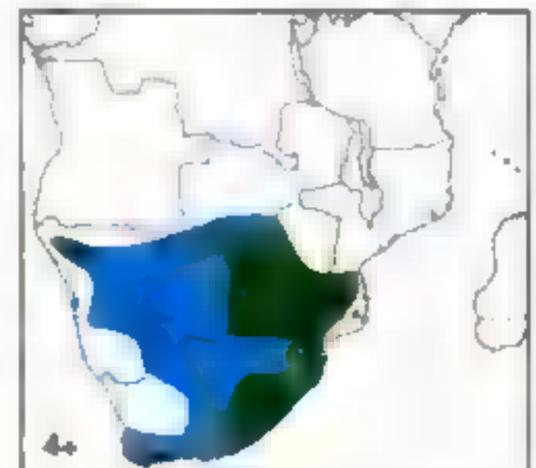
Cliffs, mountains, grassland, thornbush, desert, to 3,000 m. Large vulture near **61** in size; relatively shorter-winged, longer-tailed; bare neck. Soars in slight V. Gregarious. [cf. 57]

**62a Adult** Palest buff above (downy ruff, too), cream/white below; blackish to grey-brown quills; bare blue neck, white down on head; eyes yellow, bill/feet blackish. Flight below (**62ax**): whitish wing-linings (usually spots on greater coverts), dark primaries/tail, greyish secondaries with dark trailing edge. Above (**62ay**): similar; always spots; browner secondaries.

**62b Juvenile** Pale brown, scaled buff above, streaked whitish below; downier buff head/neck; feathery ruff streaked whitish; eyes brown. Flight below (**62bx**): pale brown with streaky body, whitish-mottled wing-linings, dark grey-brown secondaries.

**62c Third-year** Coverts buff-white; ruff still feathery, back scaled, slight streaks below. (Eating Common Zebra *Equus burchelli*.)

Text and map page 435





## PLATE 23: LARGER AFROTROPICAL VULTURES II AND BATELEUR

### 64 Lappet-faced Vulture *Aegypius tracheliotus*

L:95–115 cm (41 in); S:250–290 cm (100 in); T:33–38 cm (14 in); ♂:92%

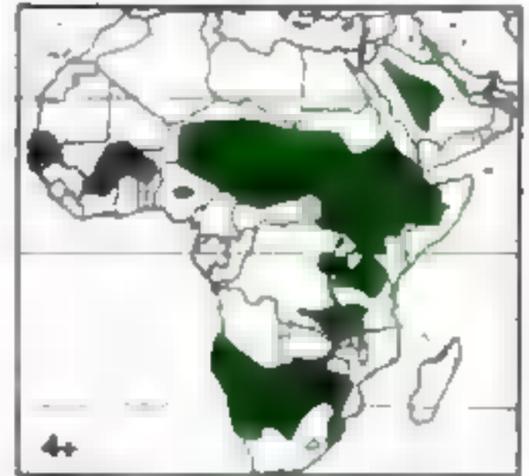
Desert, dry plains, dry thornbush/savannah, wooded grassland, mountain plateaux, to 3,000 m (4,000 m). Huge bulky vulture; long broad wings, wedged tail, massive bill, fleshy folds on bare head, downy thighs. Deep beats; glides on flat wings, hands dropped and angled back; soars on flat wings. Often solitary; dominant at carcasses. [cf. 59/63(Pal)/65b/c55]

**64a Adult** (nominate; Africa) Blackish above, thinly edged brown; head pink to red, bluer on cheeks, blushing scarlet in excitement (**64ax**); brown ruff fringed by white down; below, thick white down, streaked by black of leathers except on thighs; bill yellowish, cere, feet pale-blue to grey. Flight below (**64ay**): white thighs and patagial bars, pinkish head, streaks body, blackish quills. On nest (**64az**).

**64b Juvenile** (*negrensis*; Arabia) Dark brown, edged rufous, showing buff underdown below; head downy whitish (bare pink in S Africa).

**64c Second-year** Flight below. Almost all brown, like **b**, with thighs still dark (half white by 4-yr), but suggestion of patagial bars, streakier chest/crissum.

Text and map page 439



### 65 White-headed Vulture *Aegypius occipitalis*

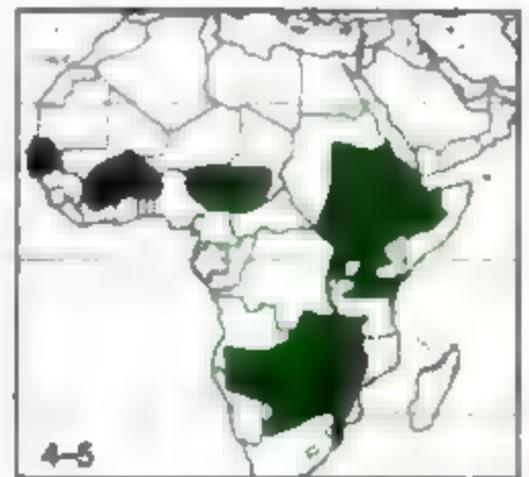
L:72–82 cm (30 in); S:207–223 cm (85 in); T:27–30 cm (11 in); ♂:93%

Savannah, wooded grassland, semi-desert, to 4,000 m. Mid-sized vulture; long wings, wedged/rounded tail, triangular head, heavy bill, downy thighs. Easier beats; glides/soars on flat wings. Often solitary; subordinate at carcasses. [cf. b55b/64c]

**65a Adult female** Blackish above, edged buff on coverts, with red bill, blue cere, bare pink face, thick white down on peaked crown and (♀ only) white inner secondaries [♂ dark grey; p.000]; white below with black breast. Flight below (**65ax**): white of crop area, abdomen, thighs and, on ♀, inner secondaries extends to axillaries and band along greater coverts (variably also mottling on medians).

**65b Second/third-year male** Mainly dark brown, but much of head already white, some white on crop area, abdomen and rear thighs. Flight below (**65bx**): indication of ad pattern of white on head, crop, abdomen and especially wing-linings. [Juvenile all dark, but bare parts and white edge to wing-linings much as ad; ♀ has white inner secondaries from 2-yr.]

Text and map page 442



### 73 Bateleur *Terathopius ecaudatus*

L:55–70 cm (25 in); S:168–190 cm (70 in); T:10–12 cm (4 in); ♂:83%

Long-grass woodland, thornbush, savannah, semi-desert, grassland, to 3,000 m (4,500 m). Mid-sized stumpy snake-eagle; very long pointed wings, 'tailless' (but jux tail 13–17 cm); bushy head. Rapid beats in take-off only; sails fast on deep V wings, tilting side to side. Solitary + social. [cf. d70/68b/69b]

**73a Adult male** Black but for chestnut from mantle to whole tail, and brownish-grey shoulders; bill black, yellow and red; cere, bare face and legs red. Flight below (**73ax**): white wing-linings; black body and remiges but for greyish-based primaries; chestnut tail, projecting red feet.

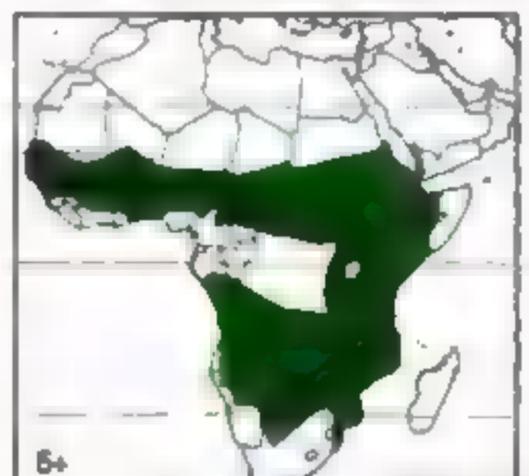
**73b Cream adult male** Back cream to pale brown, tail pale chestnut.

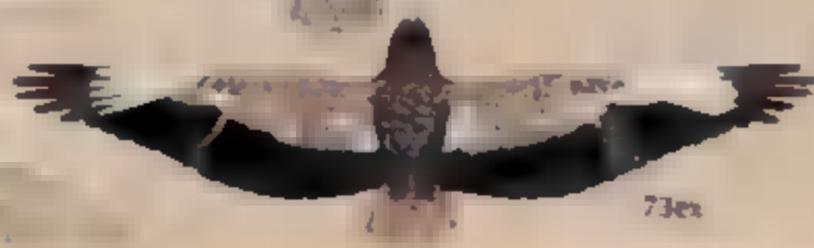
**73c Adult female** and flight inset (**73cx**): Secondaries black-tipped grey, variably separated from browner shoulders by dusky to brown greater coverts. Flight below (**73cy**): thin black wing-edge.

**73d Juvenile** Brown, edged rufous above; eyes brown (cf. 69b/70), bill grey-blue, cere/face green-blue, legs green-grey. Flight below (**73dx**): all brown; broader wings, longer tail than **a/c**.

**73e Fifth-year male** Blackish, mottled chestnut on back and grey on shoulders; cere/face orange, feet pink. Flight below (**73ex**): white mottling on wing-linings now begins ad pattern. [Until 3-yr like shorter-tailed juvenile; darkens in 4-yr; adult by 7/8-yr.]

Text and map page 455





## PLATE 24: INDO-PALEARCTIC AND AFROTROPICAL SNAKE-EAGLES I

### 67 Short-toed Snake-eagle *Circaetus gallicus*

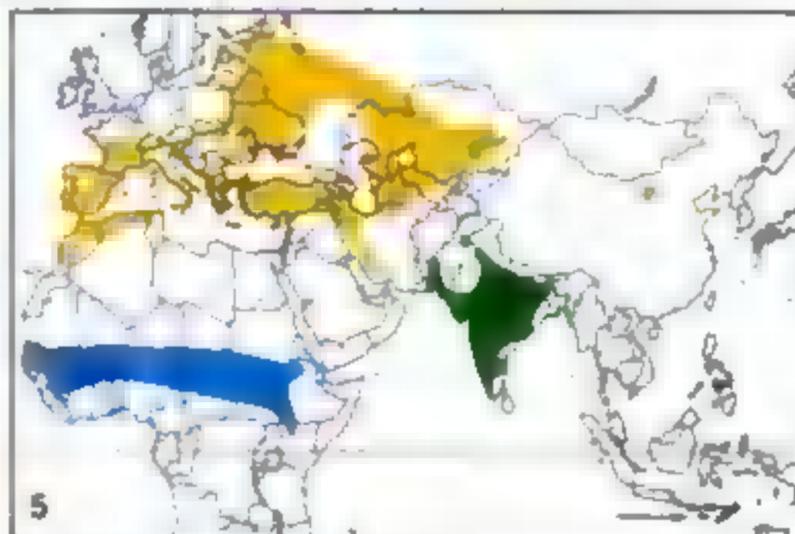
Text and map page 445

L62–70 cm (26 in): S166–188 cm (70 in): T26–33 cm (12 in): ♂91%

Timbered open country, to 2,000+ m. Big snake-eagle; long rounded wings, longish tail, large head; wings reach tail-tip. Glides on slightly arched wings, hands dropped; soars flatter; often hovers. Solitary; social on migration. [cf. 68/69c/18ce/19a/8/203 etc./74g/237gh/238de]

**67a Adult** Brown/grey-brown above, edged paler; white below, more or less dark-marked; cere/legs grey. Flight below (**67ax-z**): dark wing-tips, 3 tail-bands; varies (x) dark hood/broad broken bars, (y) less clear hood/paler bars, to (z) white head/almost plain.

**67b Juvenile** Often indistinguishable; throat/chest and blobs (rather than broken bars) below tend to rufous. Hovering above (**67bx**): as a.



### 68 Beaudouin's Snake-eagle *Circaetus beaudouini*

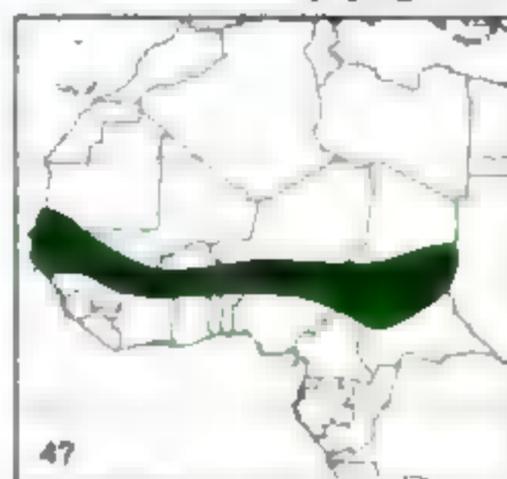
Text and map page 448

L60–66 cm (25 in): S155–170 cm (64 in): T25–28 cm (10 in): ♂89%

Woodland, fertile plains, to c1,500 m (2,000 m). Much like smallest 67, often thought conspecific (but this unlikely); shorter wings fall short of tail-tip. Adult/juvenile differ. [cf. 67/69c/18ce/8/248]

**68a Adult** Darker brown above than 67, with 3–4 tail-bands; chest grey-brown, white below with thin even bars. Flight below (**68ax**): dark hood, plainer wing-linings, more even bars on body; bands on remiges.

**68b Juvenile** All dark brown or, as here, dull red-brown below barred only on flanks/crissum. Flight below (**68bx**): body and wing-linings dark brown or rufous, without darker hood of a or many 67. Later (**68by/z**): head, neck and underparts become largely whitish.



### 69 Black-chested Snake-eagle *Circaetus pectoralis*

Text and map page 450

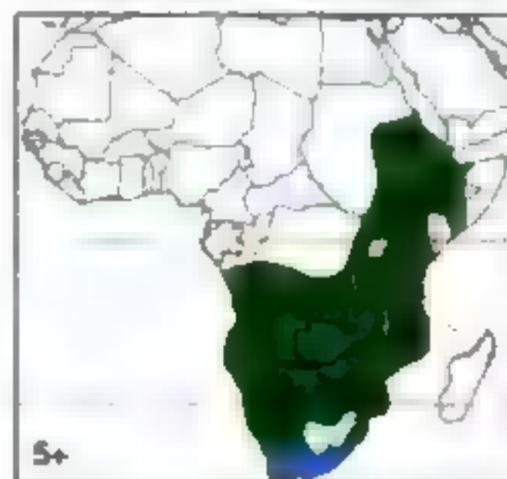
L63–71 cm (26 in): S160–185 cm (68 in): T26–29 cm (11 in): ♂87%

Wooded grassland, savannah, thornbush, desert, to 3,400 m. Shape/flight as 67; hood blacker than dark 67 or 68a. Adult/juvenile differ. Solitary; may roost/hunt socially. [cf. a248/68; b70–72]

**69a Adult** Blackish back/head/chest, often whitish throat; abdomen plain white; eyes yellow, legs whitish. Flight below (**69ax**): black to chest, white abdomen/wing-linings, 3-banded quills.

**69b Juvenile** Dark brown above, edged rufous; head/underbody rich red-brown. (Prev night adder *Causus rhombartus*.) Flight (**69bx**): linings as body; quills grey, bars faint; tail looks plain from afar.

**69c Second-year** In flight. By end 2-yr rufous replaced by dark grey-brown and white; wings/tail whiter, bands clearer; abdomen spotted.



### 70 Brown Snake-eagle *Circaetus cinereus*

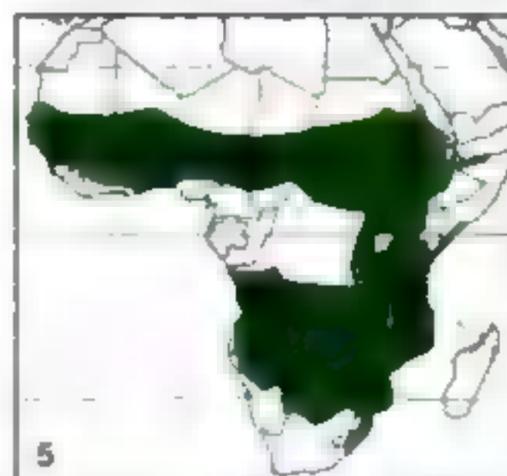
Text and map page 451

L71–78 cm (29 in): S160–185 cm (68 in): T25–30 cm (11 in): ♂94%

Woodland, savannah, thornbush, to 2,000 m. Size as largest 67, again with big cowled head; narrower wings look longer; tail shorter, so wing-tips still reach tip. Adult/juvenile often similar. Hovers less; more often hunts from perch. Solitary. [cf. 73d/69b]

**70a Adult** All dark brown; 3 thin whitish tail-bars; eyes yellow as congeners, cere/legs grey-white. Flight below (**70ax**): body and wing-linings brown, remiges plain dull white with greyish wing-tips; broad brown tail-bands.

**70b Juvenile** Some indistinguishable from a, unless edged paler above; others flecked white on crown/nape and abdomen/thighs; others again (S Africa) more streaked on head, blotched white below.





68b1



## PLATE 25: AFROTROPICAL SNAKE-EAGLES II

### 71 East African (Banded) Snake-eagle *Circaetus fasciolatus*

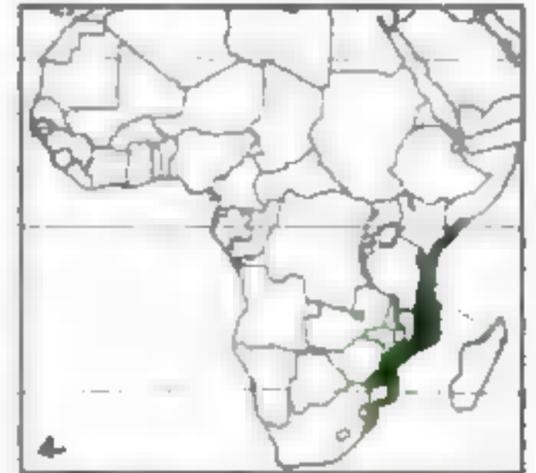
L54–60 cm (22 in): S119–128 cm (49 in): T25–27 cm (10 in): ♂90%

Coastal/lowland forest, dense woodland, often by water, to 1,500 m. Smallish snake-eagle; broad rounded wings, longish squared tail, large head; wing-tips well short of tail-tip. Fast shallow beats; seldom flies far, soars only in display. Secretive; still-hunts. Call high *ku-ku-ku-ku-ku*. [cf. 72/9]

**71a Adult** Head/breast dark grey-brown; back/coverts blacker, tipped rufous; grey-brown tail banded blackish and tipped white; white abdomen/thighs barred grey-brown. Flight below (**71ax**): lines-banded wings look whitish with black trailing edge; 3 tail-bands. Above (**71ay**): back/wings blacker than grey head.

**71b Juvenile/immature** Brown above, head variably white-streaked, tail-bars thinner; white below, thin dark streaks on throat/chest, buff-tinged on breast, later buff-banded lower down. Flight below (**71bx**): paler, whiter-headed, more lightly marked than a.

Text and map page 452



### 72 (Smaller) Banded Snake-eagle *Circaetus cinerascens*

L50–58 cm (21 in): S120–134 cm (50 in): T22–23 cm (9 in): ♂90%

Riverine forest, wetter wooded savannah, to 2,000 m. Smallish stocky snake-eagle; relatively short tail; wing-tips almost to tail-tip. Rapid shallow beats; perches for long periods like 71, but less shy, soars more readily. Less vocal: *ku-ku-ku-ku-ku-ku-ku*, mainly in flight. [cf. 71 and 70]

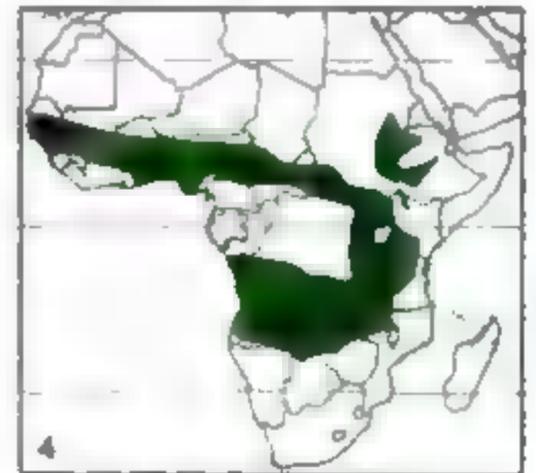
**72a Adult male** All grey-brown, variably barred white on belly/flanks (often indistinct, even absent); tail with broad central white band; bill-base yellow. Flight below (**72ax**): much as **71ax** but for tail, though wing-linings plain white or hardly barred and body more uniform. Above (**72ay**): back/wings little darker than head; black tail-base less clear when tail folded.

**72b Adult female** Usually darker, more boldly barred on belly/thighs.

**72c Juvenile** Brown above, edged buff; whitish head dark-streaked; tail whitish-brown with dark subterminal band; buff-white below, darkest on breast, brown markings on belly/thighs. Flight below (**72cx**): body/wing-linings buff-white, remiges obscurely barred; tail with broad distal band, dusky base.

**72d Immature** All dark brown plumage, without any grey or barring, probably assumed between c and a; tail/remiges much as a.

Text and map page 454



### 87 West African Serpent-eagle *Dryotriorchis spectabilis*

L54–60 cm (22 in): S94–106 cm (39 in): T25–27 cm (10 in): ♂90%

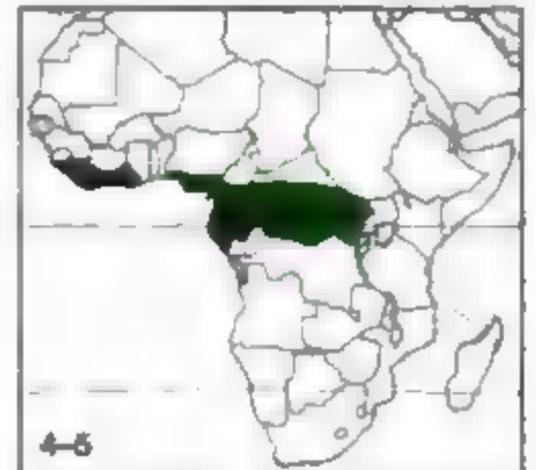
Primary forest, below 900 m. Smallish accipiter-like snake-eagle; short broad wings, long graduated tail, big head; eyes, parrot bill; wing-tips barely exceed tail-base. Still-hunts from low perches, large eyes adapted to dim light. Nasal *coo-coo-coo* in series characteristic; also miaowing. [cf. 236/151]

**87a Adult** (nominate; W from Cameroon) Blackish above, rufous collar; white below, variably washed rufous, with black throat-stripe and moustaches, blobs on breast, browner bars on thighs. Flight below (**87ax**): dark marks on white wing-linings; 5–6 bands on long tail. Above (**87ay**): rufous collar, banded tail.

**87b Adult** (*batex*, E/S from Cameroon) Browner above, whiter below; spots/bars confined to flanks. Flight below (**87bx**): little or no rufous, white central body, fewer marks on wing-linings.

**87c Juvenile** (nominate) Crown/mantle whitish and rufous, spotted black; coverts edged whitish; white below, spotted black and rufous. Flight below (**87cx**): spots, not bars, tail-bands fainter.

Text and map page 471





## PLATE 26: MAIN COMPLEX OF INDOMALAYAN SERPENT-EAGLES

### 74 Crested Serpent-eagle *Spilornis cheela*

L50–74 cm (24 in): S109–169 cm (55 in): T22–32 cm (11 in): ♂90%

Forest, wooded mountains, to 2,000 m (3,000+ m). Large/small; broad rounded wings, mid-length tail; flat head, puffy crest. Glides/soars on shallow V wings. Shrill 1- to 3-syllable scream. [g67/237 etc.]. Insular forms 76–86 below often treated as races.

**74a Adult** (nominata; Pakistan/N India) Brown, redder below, spotted; blackish head. Flight (74ax): bold white band on wings/tail.

**74b Adult** (*burmanicus*; Burma, Indochina) Smaller; paler; more barred.

**74c Adult** (*melanotis*; S India) Smaller; plainer breast; 2 bands.

**74d Adult** (*spilogaster*; Sri Lanka) A/c, still smaller; grey throat.

**74e Adult** (*davisoni*; Andamans; cf. 75) More barred; paler buff below.

**74f Adult** (*richmondi*; Borneo; cf. 82) Small; very pale; grey throat.

**74g Juvenile** Pale-edged and streaky whitish; dark mask. Flight (74gx): barred remiges, banded tail.

Text and map page 457



### 76 Central Nicobar Serpent-eagle *Spilornis minimus*

Text and map page 461

L41–45 cm (17 in): S89–103 cm (38 in): T17–19 cm (7 in): ♂92%

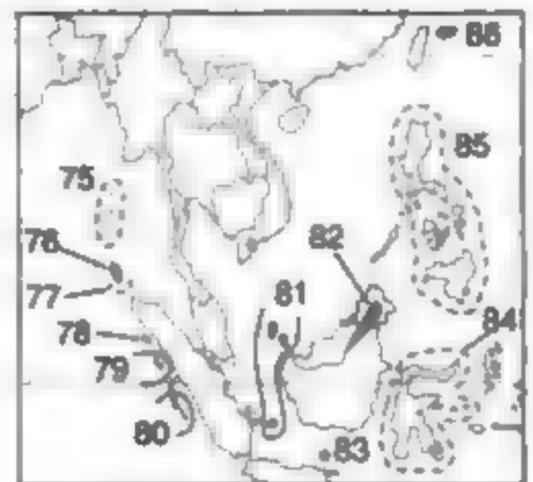
Tiny; pale grey-brown; greyish cheeks/breast; barred below; pale tail-base.

### 78 Simeulue Serpent-eagle *Spilornis abbotti*

Text and map page 463

L49–54 cm (20 in): S108–120 cm (45 in): T20–23 cm (8 in): ♂88%

Small; dark; purplish-brown above; barred below; black tail-base, brownish-white band.



### 79 Nias Serpent-eagle *Spilornis asturinus*

Text and map page 463

L43–46 cm (18 in): S95–102 cm (39 in): T18–19 cm (7 in): ♂91%

Tiny; pale brown above with contrasting black crown; greyer cheeks; more spotted below.

### 80 Mentawai Serpent-eagle *Spilornis sipora*

Text and map page 464

L47–50 cm (19 in): S95–105 cm (39 in): T21–22 cm (8 in): ♂87%

Small, short-winged; chocolate-brown with black crown, blackish cheeks; spotted below.

### 81 Natuna Serpent-eagle *Spilornis natunensis*

Text and map page 465

L44–48 cm (18 in): S95–109 cm (40 in): T18–19 cm (7 in): ♂86%

Tiny; darker back/tail, greyer cheeks than 76; faintly barred breast, spotted belly.

### 82 Kinabalu Serpent-eagle *Spilornis kinabaluensis*

Text and map page 466

L55–58 cm (22 in): S118–129 cm (49 in): T25–26 cm (10 in): ♂94%

a/ax: Larger than 74f (both Borneo); blackish, finely spotted white below; nape brown.

### 83 Bawean Serpent-eagle *Spilornis baweanus*

Text and map page 467

L46–51 cm (19 in): S100–115 cm (42 in): T21–23 cm (9 in): ♂85%

Small; dark; rich brown throat/breast; barred below; brown tail-base, thin white band.

### 86 Ryukyu Serpent-eagle *Spilornis perplexus*

Text and map page 470

L50–56 cm (21 in): S110–123 cm (46 in): T22–24 cm (9 in): ♂89%

Smallish; paler even than 74f, with strongly contrasting white-mottled black crown/nape.



## PLATE 27: HIGHLY DISTINCT INDOMALAYAN SERPENT-EAGLES

### 75 Andaman Serpent-eagle *Spilornis elgini*

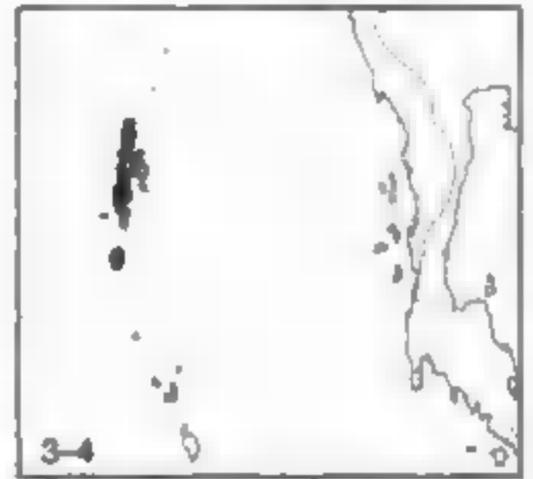
L51–59 cm (22 in): S115–135 cm (49 in): T22–24 cm (9 in): ♂79%

Forest clearings, wooded hillsides, to 700 m (little overlap with much paler 74e, which inhabits mangroves, tidal creeks). Smallish; relatively short-tailed. [cf. 74e]

**75a Adult** Dark chocolate, speckled white on body/coverts; barely darker black crown edged buff; tail with 2 thin pale bands. Flight below (75ax): blackish, breast linings speckled white, crissum barred; narrow white bands on dark quills.

**75b Juvenile** Not so dark as a: more white edges above, spots below; head white with dark feather-centres and mask, streaked throat. Flight below (75bx): like pale ax with streaky head, 3 bands on tail, 4–5 on wings (2 and 3–4 respectively on a).

Text and map page 460



### 77 Great Nicobar Serpent-eagle *Spilornis klossi*

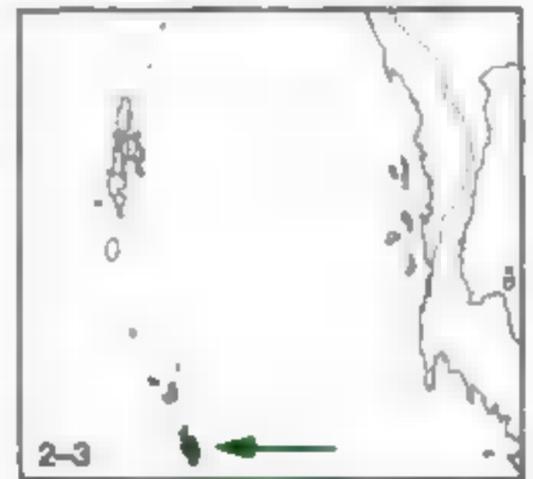
L38–42 cm (16 in): S85–95 cm (35 in): T17–20 cm (7 in): ♂82%?

Primary forest, to 600 m. Minute (smallest of serpent-eagle complex); relatively long-tailed: size more like accipiter.

**77a Adult** Black crown cinnamon-tipped; brown nape, dark brown back, white-tipped coverts; tail unevenly banded, with broad black sub-terminal; grey cheeks; rich buff throat/breast fading to whitish belly/flanks. (Prey Emerald Dove *Chalcophaps indica*.) Flight below (77ax): wing-linings whitish as belly/flanks; remiges/tail both with black sub-terminal and 2 other bands.

**77b Juvenile** Like a, but buff-white tips above; tail more barred. Flight below (77bx): paler than ax; 3 narrow tail-bars, and remiges thinly barred, both lacking bold subterminal band.

Text and map page 462



### 84 Sulawesi Serpent-eagle *Spilornis rufpectus*

L46–54 cm (20 in): S105–120 cm (44 in): T22–25 cm (9 in): ♂83%

Savannah, forest, edges, to 1,000+ m. Small; wings broad/rounded as whole genus, but relatively shorter-winged/longer-tailed.

**84a Adult** (n nominate; Sulawesi) Black head, buff-tipped; dark brown above, pale tail-band; rufous below, chest thinly streaked black, abdomen barred white and black. Flight below (84ax): black head, rufous chest, spotted belly/wing-linings; bold whitish wing-band and 2 on tail (sub-terminal black widest).

**84b Adult** (*sulaensis*; Sula Islands) Slightly smaller; much paler.

**84c Juvenile** Black-streaked creamy head, dark mask; blotchy brown and cream above; brown-streaked white below, abdomen washed rufous. Flight (84cx): linings mottled rufous, quills barred.

Text and map page 468



### 85 Philippine Serpent-eagle *Spilornis holospilus*

L47–53 cm (20 in): S105–120 cm (44 in): T23–26 cm (10 in): ♂83%

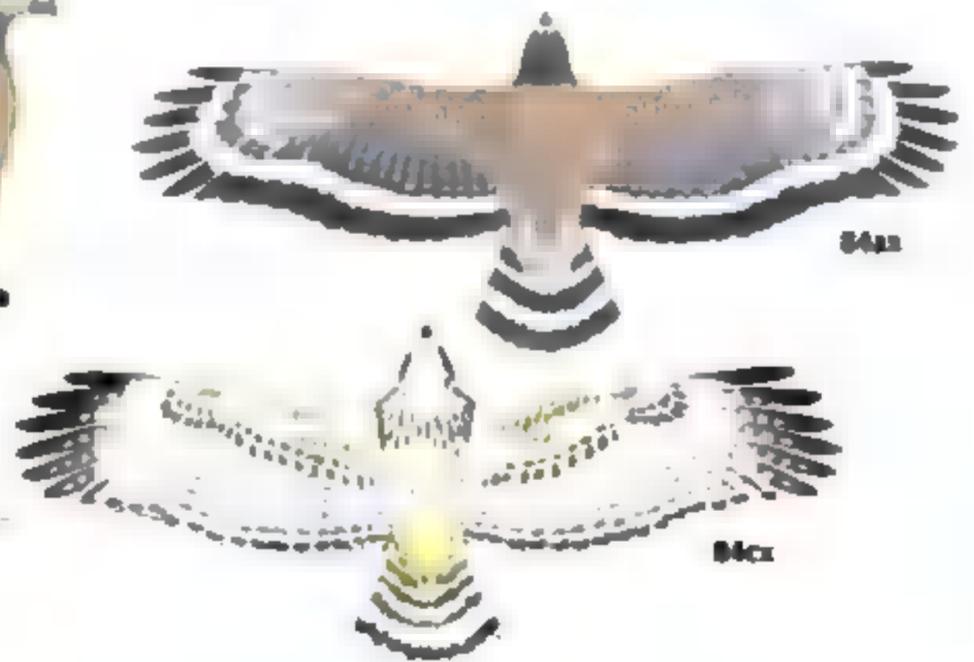
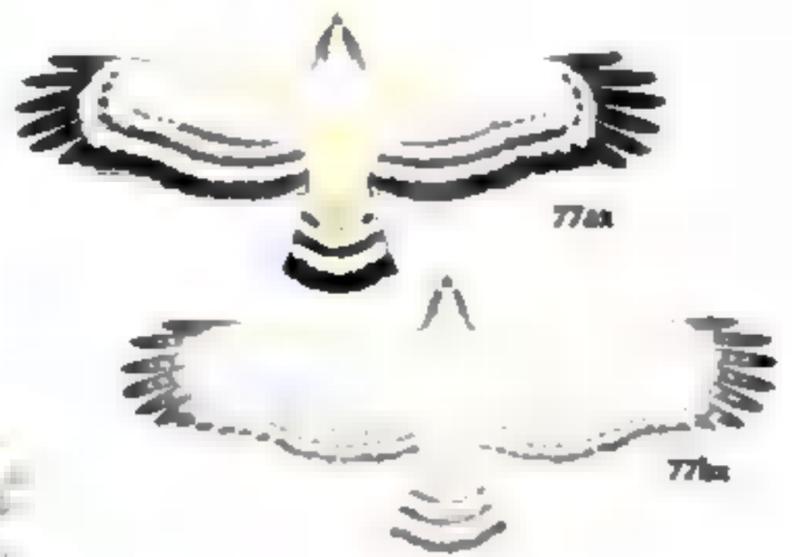
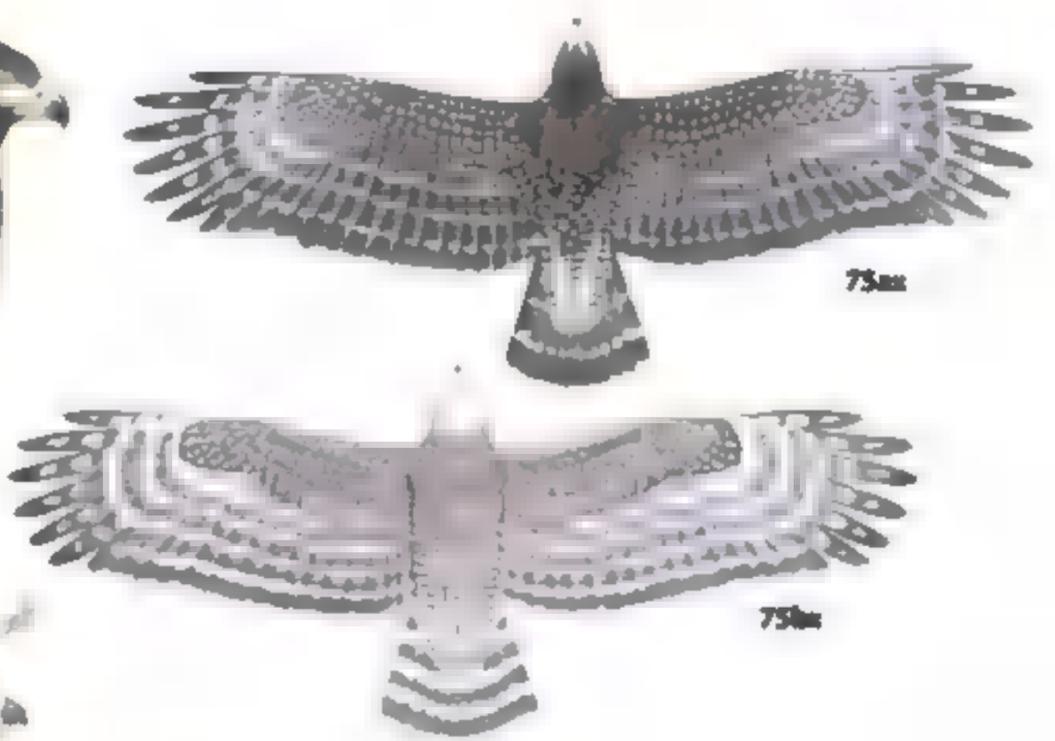
Riverine forest, wooded foothills, open country, to 1,500 m (2,500 m). Small; again relatively short-winged/longer-tailed. [cf. b237/241/233 immatures]

**85a Adult** Grey-brown head, rufous-edged crest; brown above, coverts white-spotted; dark brown tail, broad pale central band; rufous below, with brown-ringed white spots. Flight below (85ax): white-spotted rufous wing-linings as body; dark brown remiges/tail with bold central and thinner basal grey bands.

**85b Juvenile** Dark-marked white head, obscure mask; brown above, edged buff, spotted rufous/white; tail banded light/dark brown; white below, streaked rufous. Flight below (85bx): white with rufous-streaked wing-linings, barred remiges, banded tail.

Text and map page 469





## PLATE 28: MADAGASCAR SERPENT-EAGLE AND GYMNOGENES

### 88 Madagascar Serpent-eagle *Eutriorchis astur*

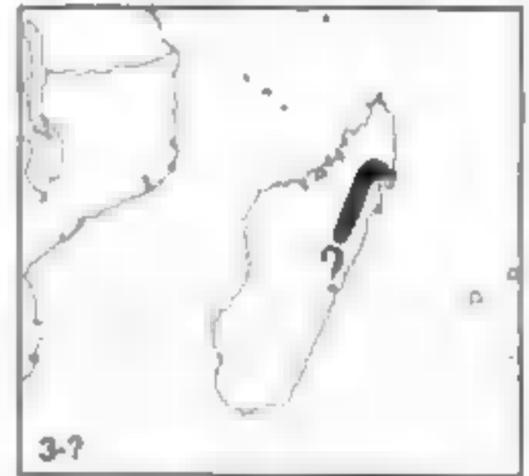
L57–66 cm (24 in): S98–110 cm (41 in): T26–29 cm (11 in): ♂90%?

Rainforest, to 1,000+ m. Smallish accipiter-like snake-eagle; short broad wings, long rounded tail, short erectile crest, knobbly legs; gentle expression, short deep 'toothless' bill, bristles hide grey cere; wing-tips to tail-base. More upright stance than shown. Feared extinct for 50 years, but several records since 1988. [cf. 152]

**88a Adult** Grey-brown above, obscurely dark-banded (esp. scapulars); thin white barring on neck-sides/shoulders; 5–7 blackish bars on brown tail; white below, closely dark-banded (densest on throat/chest). Flight below (**88ax**): white linings closely dark-banded much as body; greyer quills also heavily barred.

**88b Juvenile** Dark bands/white tips above; crest mottled white but not shoulders; quills more pointed, tail tipped white; streakier cheeks; less dense bars below, tinged rufous; eyes brown to yellow-white. Flight below (**88bx**): less barring; head paler.

Text and map page 472



### 90 Madagascar Gymnogone *Polyboroides radiatus*

L57–61 cm (23 in): S116–132 cm (49 in): T29–33 cm (12 in): ♂85%

Wooded areas, esp. palm savannah, to 2,000 m. Smaller than **89a**, nearer to W African **89c**, but relatively shorter-winged and longer-tailed; wing-tips well short of tail-tip. Flight and behaviour similar; forages more on ground where deforested.

**90a Adult** Pattern as **89a** but paler grey (much paler than **89c**); bare yellow face likewise flushes red in excitement. Flight below (**90ax**): pale grey head; finely barred body and linings; wider black trailing wing-edges than **89**; white band on black tail.

**90b Juvenile** Medium brown above with white-edged coverts, dark-banded quills; crown/face/breast white or mixed with brown; browner below, somewhat barred on flanks/crissum; bare face blackish. Flight below (**90bx**): brown-blotched white head, breast and wing-linings; barred abdomen; all-banded remiges and tail.

**90c Second-year** Intermediate between **b** and **a**; moults directly (cf. **89f**).

Text and map page 476



### 89 African Gymnogone *Polyboroides typus*

L51–68 cm (23 in): S118–152 cm (53 in): T26–32 cm (11 in): ♂90%

Forest, riverine woodland, savannah, thornbush, cultivation with eucalyptus, to 3,000 m. Gangling hawk, much larger than American equivalent (**164**); long broad wings, longish rounded tail, small maned head, bare face; wing-tips well down tail. Slow buoyant beats; glides/soars on flattish wings. Takes oil palm fruits (W Africa), or insects, eggs, nestlings and small vertebrates, inserting slim head or double-jointed leg inside crevices, often hanging with flapping wings; also hunts from flight/perch, or walking on ground. Solitary. [cf. 104–106/72/163]

**89a Adult** (nominate; E/S Africa) Mainly grey above; black blobs on scapulars/coverts; white band on black tail; abdomen barred black/white; yellow face flushes red in excitement. Flight below (**89ax**): grey head; barred body/wing-linings; grey-based remiges, bold black wing-tips/trailing edges; white tail-band.

**89b Grey adult** (nominate) Barring all more or less replaced by grey.

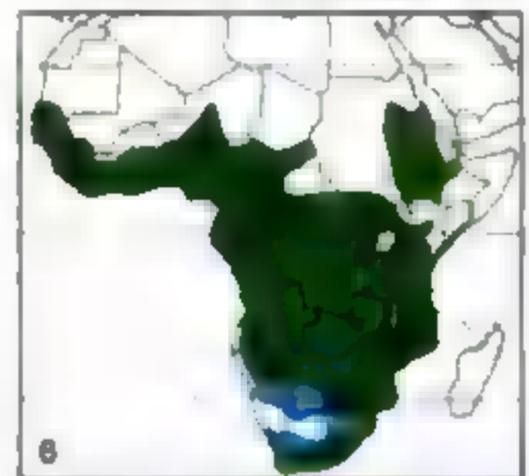
**89c Adult** (*pectoralis*, W from W Sudan) Smaller; darker; bolder-banded.

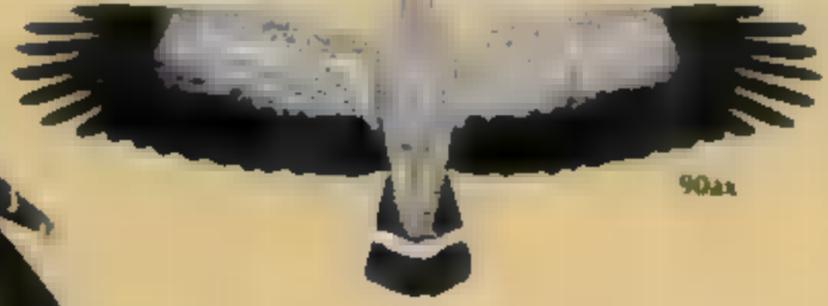
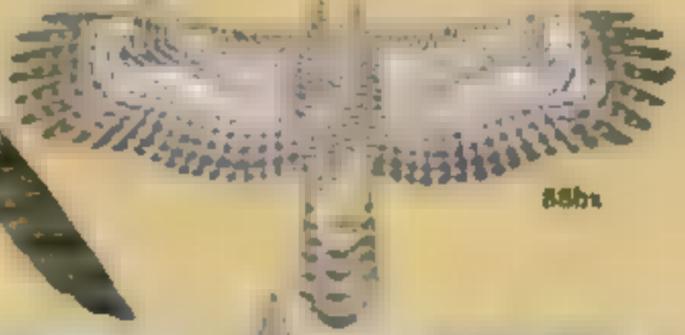
**89d Dark juvenile** All dark brown, edged rufous; tail faintly barred; breast streaky, belly dark or barred rufous; face blackish.

**89e Pale juvenile** In flight. Whitish to rufous below, breast/linings streaked rufous or dusky, belly all rufous or barred; greyish quills lightly barred, wings dark-tipped. [Much as **d** above.]

**89f Late second-year** Transition variable; most have partial 2nd plumage browner/more barred than **a**, then moult to **a**; face yellowing.

Text and map page 474





## PLATE 29: NEARCTIC AND NEOTROPICAL HARRIERS

### 94 Northern Harrier *Circus hudsonius*

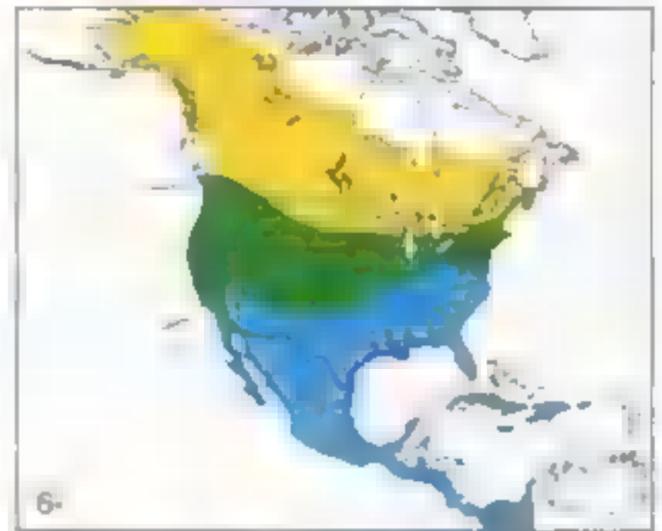
Text and map page 483

L41–50 cm (18 in): S97–122 cm (43 in): T22–25 cm (9 in): ♂78%  
Marshland, open country/boreal forest, fields, to 2800 m. Mid-sized harrier with roundish-tipped wings, long narrow tail; legs 10% longer than 93/95; wing-tips short of tail-tip. Slow flexible beats; glides in V; soars in shallower V or flat. Hunts by low quartering. Sometimes 100s in winter roosts. Usually treated as conspecific with 93. [cf. 2/189ab/209cd; a24]

**94a Adult male** Grey head/chest, darker back/wings, white rump; tail obscurely banded; white below, breast/belly variably spotted rufous, often thighs/crissum too. Flight (94ax): white rump; white underwings with black tips, dark band by rear edge.

**94b Adult female** Dark brown above, mottled tawny; rump white, tail evenly banded light and dark; dark-streaked creamy below; eyes brown to (after 2–6 years): yellow. Flight (94bx): white rump; remiges barred, strongest on darker secondaries which combine with streaked coverts as dark patch on inner wings.

**94c Juvenile (male)** ♂♀ darker above than b; rufous below fading to buff/cream, only chest streaked; eyes pale greyish (♂): or brown (♀). Flight (94cx: ♀): inner underwings darker than b.



### 95 Cinereous Harrier *Circus cinereus*

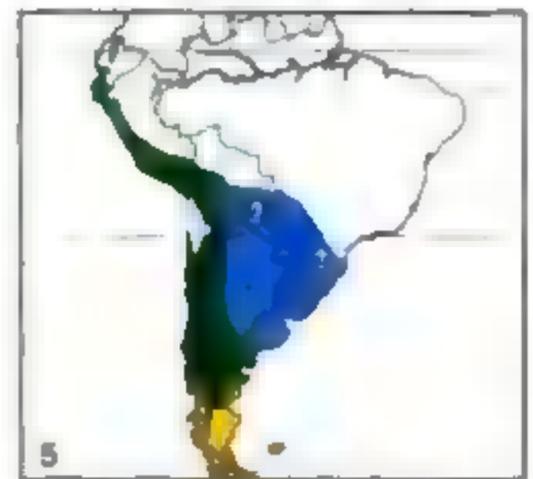
Text and map page 486

L39–48 cm (17 in): S90–115 cm (40 in): T21–28 cm (10 in): ♂72%  
Marshes, grassland, cultivation, to 4,500 m. Superspecies with 93/94; smaller, relatively shorter-winged and longer-tailed; wing-tips well short of tail-tip. Actions similar. [cf. 103/b258; a24]

**95a Adult male** As 94a, but tail greyer with wider darker subterminal, whole abdomen/thighs boldly barred rufous. Flight (95ax): underwings as 94ax, but white stands out against barred body.

**95b Adult female** Dark brown above, edged/spotted buff/grey; white rump; quills tinged grey; white below, throat streaked, chest barred brown, rest barred rufous. Flight (95bx): white rump; wing-linings barred rufous; inner wings not darker (cf. 94b).

**95c Juvenile (male)** Blacker-brown above than b, hardly any grey tinge; buff-white below, streaked dusky on throat/chest and rufous on abdomen/thighs (or spotted/barréd on belly). Flight (95cx: ♀): wing-linings streaked rufous; inner wings just darker.



### 103 Long-winged Harrier *Circus buffoni*

Text and map page 507

L46–60 cm (21 in): S119–155 cm (54 in): T23–29 cm (10 in): ♂80%  
Reedbeds, hunting over marshes, ricefields, cultivation, to 1,000 m. Largest harrier, but lightly built; lanky, with noticeably long wings; tips nearly reach tail-tip. Flight as congeners (e.g. 94). Solitary. [cf. 95/2/3]

**103a Pale adult male** Black above, with banded grey greater coverts and quills, white rump; white forehead/supercilia, whitish throat; white below with black chest-band, odd streaks/spots; eyes brown, cere grey. Flight (103ax): black above with contrasting banded grey remiges/tail, white rump; white below with dark chest, fine bars on wing-linings, banded quills.

**103b Pale adult female** More like ♂ than most harriers, but browner above, face marks creamier, more streaks below. Flight (103bx): white rump; remiges less grey above; wing-linings streaked/barréd.

**103c Dark adult (male)** In flight, ♂♀ sooty-black, browner below, but white on face, barred rump, quills as a or b, sometimes rufous thighs.

**103d Juvenile (male)** Brown above, edged paler; more streaked below than b. Flight (103dx: ♀): wing-linings also streaked; no contrast on upperwings (cf. a/b). Dark morph (103dy: ♂): barred rump; far more heavily streaked blackish below, thighs/vent rufous.





## PLATE 30: AFROTROPICAL AND MALAGASY HARRIERS

### 92 Black Harrier *Circus maurus*

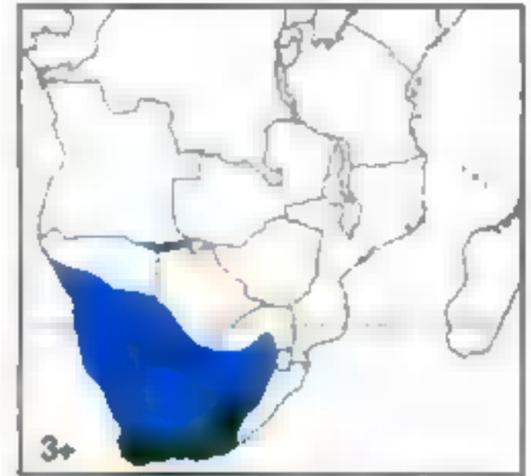
L44–48 cm (18 in): S105–115 cm (43 in): T23–27 cm (10 in): ♂79%

Scrub, grassland, wheat; less in marshes; locally mountains to 3,000 m. Mid-sized heavy-bodied harrier; relatively short round-tipped wings, long tail; wing-tips well short of tail-tip. Flight as other harriers (e.g. 93/94/98); hovers more regularly 1–2 m up with slow flaps. Solitary. Also crepuscular. [cf. 100f/98bd]

**92a Adult male** All brownish-black with white rump, grey secondaries, grey-banded tail; some thin white edges on abdomen/thighs. Flight below (92ax: ♀): blackish but for black-tipped white remiges with thin bars on inner secondaries, white-banded tail. Above (92ay: ♀): white rump; black-tipped grey remiges.

**92b Juvenile female** Dark brown above, edged rufous-buff, with white rump; whitish supercilia; nape/throat; buff below, streaked or blotched brown on breast. Flight (92bx/y: ♂): buff wing-linings also blotched; quills not unlike a, but patterns less clear.

Text and map page 479



### 99 African Marsh Harrier *Circus ranivorus*

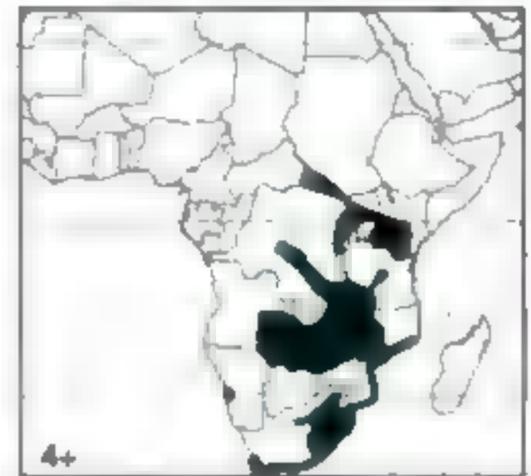
L44–49 cm (18 in): S105–125 cm (45 in): T21–25 cm (9 in): ♂81%

Marshes, wet grassland, to 3,000 m. Mid-sized harrier, smaller and slimmer than 100; wings similarly roundish-tipped, tail relatively longer; wing-tips well short of tail-tip. Typical harrier flight; tends to fly higher when quartering, at 5–10 m, than dry-habitat species. Solitary. [cf. 100df/96b/98c]

**99a Adult** Dark brown above, edged rufous; no white rump but dappled shoulders; dark-banded tail grey centrally, rufous at sides; throat/breast streaked brown and white; abdomen plain rufous to brown, or streaked brown or blotched white. Flight below (99ax/y): pale (x); or streaky (y); buff linings also variably streaked; white remiges and grey tail all barred black. Above (99az): whitish forewings; rufous rump; boldly barred tail.

**99b Juvenile** Dark chocolate, edged buff above, with buff shoulders, obscurely paler-banded tail; variable white on nape and face, ragged white breast-band, chestnut abdomen and rump. Flight below (99bx): white chest-band; rufous wing-linings variably streaked blackish; grey quills with inconspicuous dark bars. Above (99by): dark but for whitish nape and buff forewings.

Text and map page 496



### 102 Malagasy Marsh Harrier *Circus maillardi*

L42–55 cm (19 in): S105–140 cm (48 in): T20–26 cm (9 in): ♂80%

Marshes, lake edges, crops, to 2,000 m (3,000 m). Mid-sized to largish harrier, relatively thickset; longish round-tipped wings, long rounded tail; wing-tips well short of tail-tip. Recalls E. Asian race of 100, and often considered conspecific, but geographically isolated and more strikingly marked. Only harrier of region.

**102a Adult male (macroceles; Madagascar/Comoros)** Head/mantle/breast white, heavily black-streaked; otherwise black above, white below, with white rump, black-banded grey secondaries, grey tail. Flight below (102ax): white wings with black tips and rear band. Above (102ay): grey and black wings, white rump.

**102b Adult male (nominate; Réunion)** In flight. Much smaller; darker head; black above; clearer subterminal tail-band; streaks below.

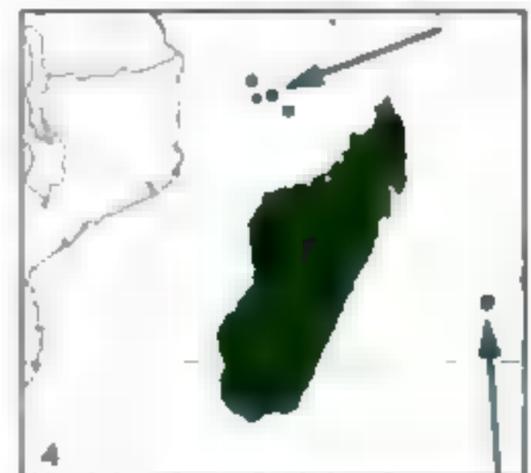
**102c Adult female (macroceles)** Dark brown and buff, strongly streaked. Flight (102cx/y): white rump and banded quills like ♀ 93–98.

**102d Adult female (nominate)** In flight. Body uniformly darker; white rump.

**102e Juvenile (male) (macroceles)**: Like darker c; no grey on upperwings, less clear white rump, as very obvious in flight (102ex, y: ♀).

**102f Juvenile (male) (nominate)** In flight. Rusty abdomen; no white rump (cf. d).

Text and map page 505





## PLATE 31: PALEARCTIC HARRIERS I

### 96 Pallid Harrier *Circus macrourus*

Text and map page 488

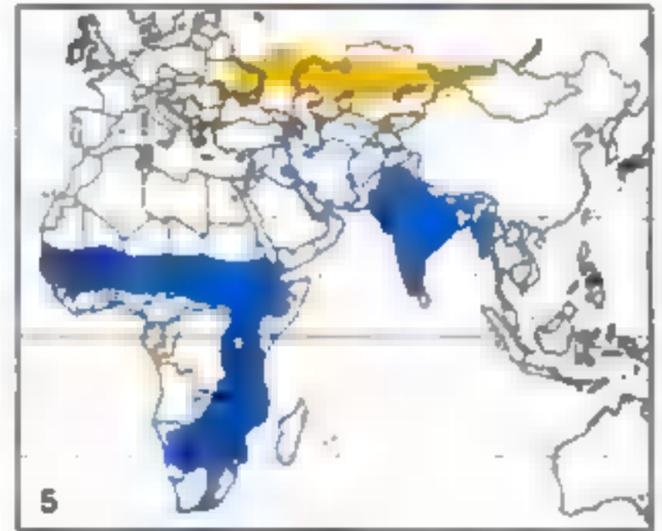
L:40–50 cm (18 in): S:100–121 cm (44 in): T:20–25 cm (9 in): ♂77%  
 Dry grassland, to 1,200 m; in winter also scrub, savannah, cultivation, marsh, semi-desert, to 3,000 m (4,000 m). Small to mid-sized slim harrier; narrow pointed wings, relatively long tail; wing-tips short of tail-tip. Light, buoyant, tern-like beats and wavering glides; glides/soars on shallow V wings; quarters ground at c1–9 m up. Solitary; congregates for grass fires, winter roosts, migration. [cf. **bed98/99**]

**96a Adult male** Palest grey and white; blackish wing-tips. Flight below (**96ax**): white with black wedge on 4 longest primaries, faint grey tail-bars. Above (**96ay**): grey with black primary wedges, grey-banded rump (looks grey), obscure bars on tail-sides.

**96b Adult female** See head (**96bz**). Dark grey-brown above, edged rufous or, on wings, more broadly buff; thin white rump, dark-banded tail; cream to rufous below, streaks heaviest on chest; often thighs barred (**98c** streaked). Flight below (**96bx**): linings streaked, primaries barred, secondaries with 2–3 grey-brown bands and trailing edges; 4–5 tail-bars. Above (**96by**): paler area on wing-coverts, thin white rump; tail rufous at sides.

**96c Juvenile (female)** See head (**96cz**). Darker and more broadly edged rufous above than **b**; plain rufous-buff below. (Prey: striped mouse *Rhabdomys pumilia*): Flight below (**96cx**: ♂): from **bx** by unstreaked body/wing-linings, dark grey or obscurely banded secondaries. Above (**96cy**: ♂): darker than **by**, clearer collar.

**96d Immature female** In flight. Dark juvenile secondaries may remain (on ♂s, too).



### 98 Montagu's Harrier *Circus pygargus*

Text and map page 493

L:39–49 cm (17 in): S:102–123 cm (44 in): T:20–24 cm (9 in): ♂95%  
 Rank grass, corn, reedbeds, heaths, moors, young conifers, scrub, to 1,500 m; in winter as **96**. Small/mid-sized harrier; shape/flight much as ♀ **96**, but wing-tips reach tail-tip. Solitary; congregates like **96**. [cf. **cef96/98**; **bd92**; **100bf**]

**98a Adult male** Dark grey above; black primaries, bar on secondaries; face to breast paler grey, shading to white abdomen streaked rufous. Flight below (**98ax**): grey head, white wing-linings streaked rufous (usually less than abdomen, sometimes plain), primary coverts barred grey-brown; outer 8 primaries black, other remiges grey-white with 1–2 black bands and thin dark trailing edge; pale grey tail obscurely barred. Above (**98ay**): dark grey, with black wing-tips and bold bar (sometimes 2).

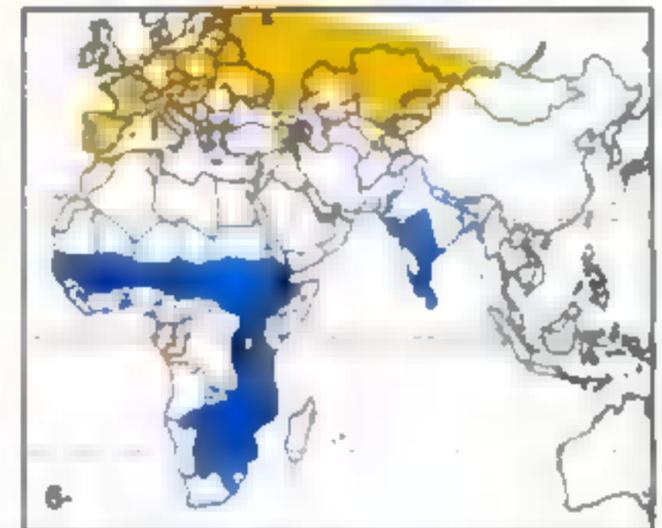
**98b Dark adult male** Blackish with thin white tips to secondaries, dark grey-brown tail. (Prey European frog *Rana temporaria*): Flight (**98bx**): often greyish primary coverts below; greyish tail.

**98c Adult female** From **96b** by head pattern (**98cz** below). Flight below (**98cx**): wider-spaced dark bands on secondaries (1–2 bands and trailing edges; cf. **93b**). Above (**98cy**): bar as **ay** (**96b** plain).

**98d Dark adult female** In flight. Dark brown with banded tail, pale grey primary bases (mottled/banded); and secondaries (dark-banded).

**98e Juvenile (male)** From **96c** only by head pattern (**98cz** below) and thin barely darker streaks on underparts. Also flight (**98ex**: y: ♂).

**98f Immature female** In flight. Dark juvenile secondaries may remain (on ♂s, too).



### Heads of female/juvenile Pallid, Montagu's and Hen Harriers

**Pallid *C. macrourus* female** (**96bz**) Streaky collar, dark cheek-crescents to bill, line divides white behind eyes. **Juvenile** (**96cz**) clear collar, solid crescents, eye-lines as ♀ under broad supercilia; plain rufous chest.

**Montagu's *C. pygargus* female** (**98cz**) Obscure collar, dark rufous-streaked crescents not to bill, eye-lines often barely visible. **Juvenile** (**98cz**) slight collar, darker crescents, eye-lines as ♀; plain chest with dark shafts.

**Hen *C. cyaneus* female** (**93bz**) (plate 32) Owl-like ruff, streaked collar and crescents, less white around eyes, but sometimes clear supercilia. **Juvenile** (**93cz**): like ♀ or sometimes (much) darker face, but no bold pattern.



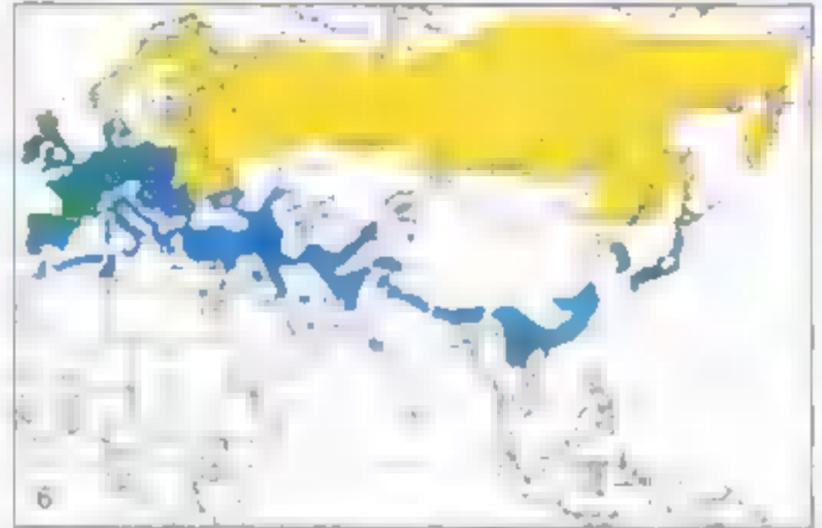
## PLATE 32: PALEARCTIC HARRIERS II

### 93 Hen Harrier *Circus cyaneus*

Text and map page 481

L42–50 cm (18 in): S100–121 cm (44 in): T20–26 cm (9 in): ♂76%

Moorland, young conifers, scrub, open taiga, steppe, wetland edge, dunes, to 1,200 m; in winter coasts, marshes, grassland, fields, to 3,000 m. Mid-sized slim harrier; roundish-tipped wings, long tail; wing-tips short of tail-tip. Usually glides on V wings, but sometimes flat or hands dropped; soars in shallow V. Often considered conspecific with 94. [cf. bc96/98; a100c]



**93a Adult male** Blue-grey head/chest (often brownish nape), slightly darker mantle/wings (may be brown-tinged), black primaries, white rump, silvery tail faintly barred at sides; white below, mottled grey on flanks. Flight below (93ax): white with grey head, black wing-tips and variable grey trailing edges, plain whitish tail. Above (93ay): blue-grey, palest on secondaries; black outer primaries, white rump, grey tail.

**93b Adult female** Very like 96b/98c but for head [see 93ba on plate 31]. Flight below (93bx): underwings as 96bx (secondaries evenly banded). Above (93by): white rump often larger and squarer.

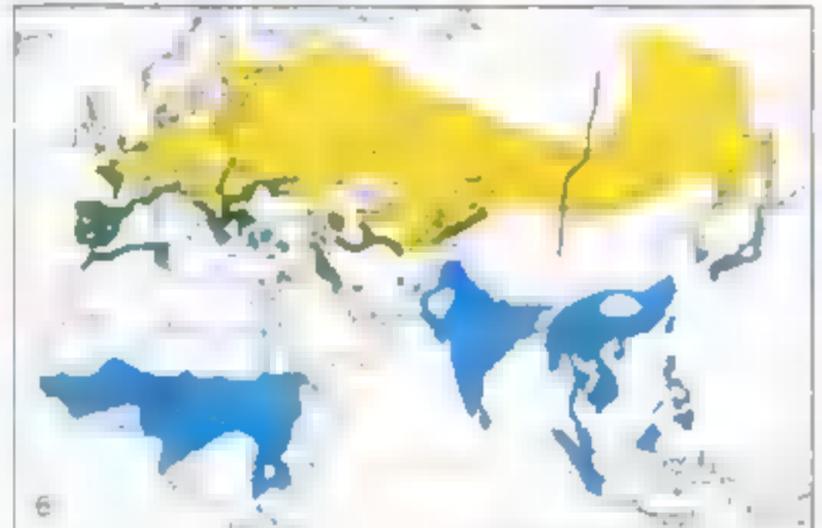
**93c Juvenile (male)** Often indistinguishable from b, but slightly more rufous with darker cheek-crescent [see 93cy on plate 31]; eyes brown (not yellow); to 3–4 yrs; differs from 96c/98e in head pattern, and streaking below. Flight below (93cx: ♀): secondaries usually hardly darker than on b (cf. 96cx/98cx).

### 100 Northern Marsh Harrier *Circus aeruginosus*

Text and map page 498

L43–54 cm (19 in): S115–145 cm (51 in): T21–26 cm (9 in): ♂86%

Extensive reeds; also wetlands, rushy grassland, farmland, to 2,000 m. Bulky harrier; relatively rounded wings; wing-tips short of tail-tip. Heavy beats; glides tilting on V wings, wrists pressed forward; sometimes dangles legs, often hunts 5–10 m up; soars on V wings. Solitary; parties on migration, communal winter roosts. Treated here as species distinct from 101/102, but often combined. [cf. df99; ceg97–99; dark f39/230b etc.]



**100a Adult male** (nominate; W/C Eurasia) Dark-streaked cream; rufous head; dark brown above, edged rufous when new, with buff shoulders, grey greater coverts/secondaries; tail: some white on rump; cream; rufous below with heavy streaks (belly darkest). Flight below (100ax–y): wing-linings black-streaked

rufous to plain white; remiges white with black wing-tips, usually dark rear edge; tail grey. Above (100ax): grey wings with black tips, brown coverts, buff shoulders; some white on rump; grey tail.

**100b Dark adult male** In flight. Black with grey tail, pale mid-wings.

**100c Adult male** (*spilonotus*; E. Asia) White head/underbody streaked black; white-spotted blackish mantle/inner coverts; shoulders white. Flight below (100cx): inner wing white. Above (100cy): brown of ax replaced by black; white; more white on rump.

**100b Adult female** (nominate) Brown, edged rufous above; crown/shoulders cream to rufous-buff streaks; dark mask; creamy throat and variable breast-patch; tail tinged rufous or, when older, grey. Flight (100dx/y): creamy crown, shoulders and throat; patch on breast; often paler-based primaries below.

**100c Adult female** (*spilonotus*) Whitest head, shoulders and underparts all dark-streaked; tail barred. Flight (100bx–y): wing-linings paler and streaked as body, remiges obscurely barred but for paler primary bases; banded tail, rufous-mottled white rump.

**100f Juvenile (female)** (nominate) Like d, but crown often plainer, usually no pale shoulders or breast; variable buff edges on mantle–wings; tail brown. Flight (100ex/y: ♂): blackish; tail just paler; crown/throat cream (x); to all dark (y); pale-based primaries.

**100g Juvenile (male)** (*spilonotus*) In flight. Paler; cream head and rufous underbody streaked; white-flecked rump; faintly barred tail.



## PLATE 33: ASIAN AND AUSTRALASIAN HARRIERS

### 97 Pied Harrier *Circus melanoleucus*

Text and map page 491

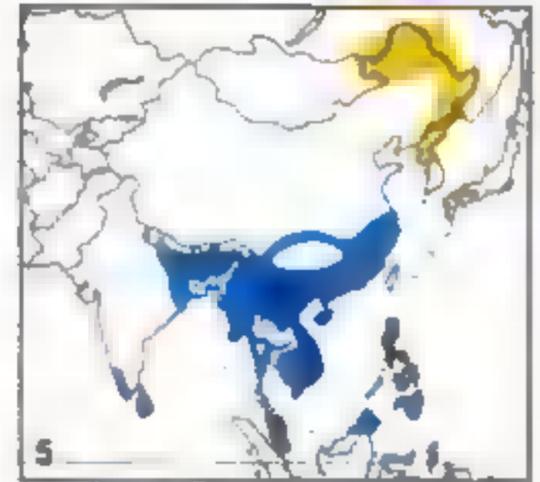
L43–50 cm (18 in): S110–125 cm (46 in): T20–24 cm (9 in): ♂87%

Steppe, boggy scrub; winters paddies, marshes, plains, crops, to 2,100 m. Mid-sized harrier; shape much as 93. Glides/soars on V wings. Solitary; parties on migration. [cf. bc93/96/98/100]

**97a Adult male** Head, back/breast black; abdomen white; tail/wings grey with black primaries and median coverts, white shoulders. Flight below (97ax): white with black head and wing-tips. Above (97ay): black and grey; whitish forewings and rump.

**97b Adult female** Streaky head, dark brown back, buff shoulders; greyish secondaries; white rump, dark-banded tail; white/cream below, variably streaked darker. Flight below (97bx): wings whitish, linings plain to broadly streaked, remiges barred darker and tipped black; tail dark-banded. Above (97by): pale leading edges, greyish secondaries; brown back, white rump, banded tail.

**97c Juvenile (female)** Dark brown above, edged rufous; streaky head, whitish nape; no grey in wings; buff/white rump; banded tail darker than b; dark rufous below, streaked blackish. Flight below (97cx: ♂): more rufous than bx, darker secondaries. Above (97cy: ♂): much darker than by, narrower white rump.



### 101 Australasian Marsh Harrier *Circus approximans*

Text and map page 503

L48–61 cm (21 in): S118–145 cm (52 in): T20–25 cm (9 in): ♂86%

Wetlands, grassland, crops; to 1,200 m in Australia, to 1,700 m in New Zealand, to 3,800 m in New Guinea. Largish bulky harrier; long roundish-tipped wings/tail as 100. Glides on V wings, wrists forward, tilting sideways; soars, kites, hovers clumsily. Solitary; migrant/roosting parties. [cf. 91b/d156]

**101a Adult male (gouldi; Australia/New Zealand)** Dark brown above, edged rufous; paler streaky head; white rump; greyish remiges, tail obscurely barred; whitish to cream below, streaked rufous. Flight below (101ax): whitish linings streaked as body, primaries pale-based, quills lightly barred. Above (101ay): barred greyish remiges, white rump, faint-barred grey tail.

**101b Adult male (spilothorax; New Guinea)** More like 102b: perhaps full species. Flight (101bx/y): boldly black/grey/white (cf. 97).

**101c Dark adult male (spilothorax)** Mostly black, including rump, but tail dark grey.

**101d Adult female (gouldi)** As a, but darker/browner above, heavier streaks below, clear tail-bands. Flight below (101dx): inner wings darker. Above (101dy): brown with white rump, banded tail.

**101e Juvenile** Mainly dark (red-)brown; whitish nape-streaks, little or no white rump, faintly barred tail. Flight (101ex): dark but for pale nape, obscure tail-bars, pale-based primaries below.



### 91 Spotted Harrier *Circus assimilis*

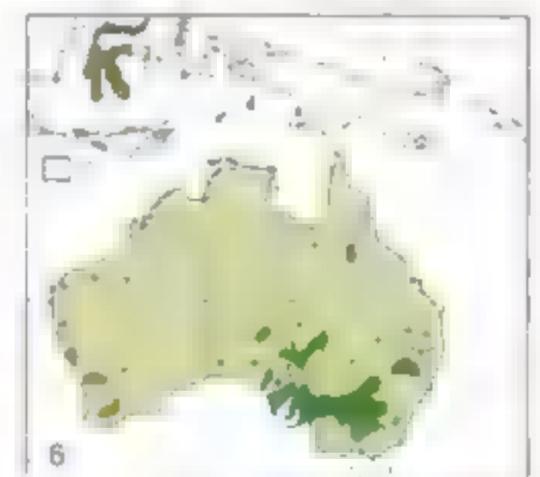
Text and map page 477

L50–61 cm (22 in): S121–147 cm (53 in): T25–29 cm (11 in): ♂72%

Grassland, crops, scrub, open woods, to 1,500 m; will hunt over water or swamps. Largish, slim lanky harrier; long broad-based wings, wedge-tipped tail. Sails on V wings; soars high; often trails one or both long legs; hovers. Solitary. Tree-nester. [cf. b101]

**91a Adult (male)** Blue-grey above, chestnut below, all spotted whitish; streaky crown, chestnut face and shoulders; black-banded grey tail. Flight (91ax: ♀): speckly blue-grey above, black-tipped primaries, barred secondaries; speckly rufous below but plain face, black-tipped whitish quills barred on secondaries/tail.

**91b Juvenile (female)** Dark brown above, with broad orange-buff edges appearing almost solid on head; forewings, more scaled on back; rufous-buff to pale brown below, thinly streaked. Flight (91bx: ♂): above, dark with orange-buff head/forewings, paler rump; below, linings as chest, quills patterned as a but greyer.





## PLATE 34: CHANTING-GOSHAWKS AND GABAR GOSHAWK

### 104 Dark Chanting-goshawk *Melierax metabates*

L42–50 cm (18 in): S86–104 cm (37 in): T20–23 cm (8 in): ♂84%  
Thornbush, savannah, to 3,000 m. Character as under 105/106.

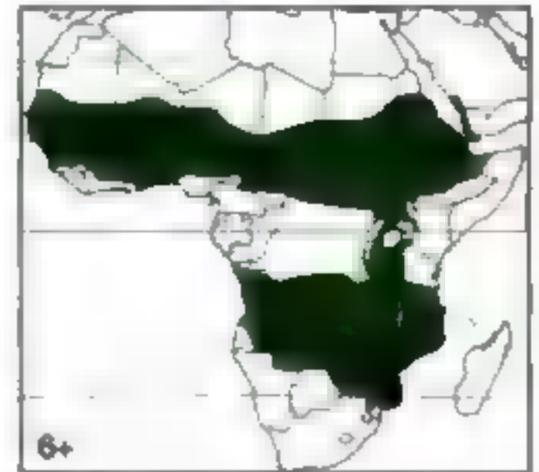
**104a Adult (male)** (nominate; Senegal/SE Tanzania) Slate-grey above, back browner; black tail broadly tipped and laterally banded white; white-freckled secondaries, larger coverts; throat: grey chest; dark-banded white abdomen and rump; eyes red-brown, cere/feet red-orange. Flight below (**104ax**): pale-banded tail; dark wing-ends.

**104b Adult (female)** (*mechowi*; S from S Uganda/SW Tanzania) Wings plain grey; cere/feet redder. Flight (**104bx**: ♂): obscure rump-patch; again blackish wing-ends (cf. **105ax**); speckled secondaries; barred linings.

**104c Juvenile (male)** (nominate) Brown above, all wing-coverts edged paler, secondaries, rump barred; tail barred darker, whitish-tipped; throat whitish, chest streaky brown; breast/belly broadly barred; eyes yellow, cere grey-brown, feet dull yellow.

**104d Juvenile (female)** (*mechowi*) In flight. Greyer-brown above than c; remiges all barred (cf. **bx**); rump barred as b, but tail more banded.

Text and map page 509



### 105 Eastern Chanting-goshawk *Melierax poliopterus*

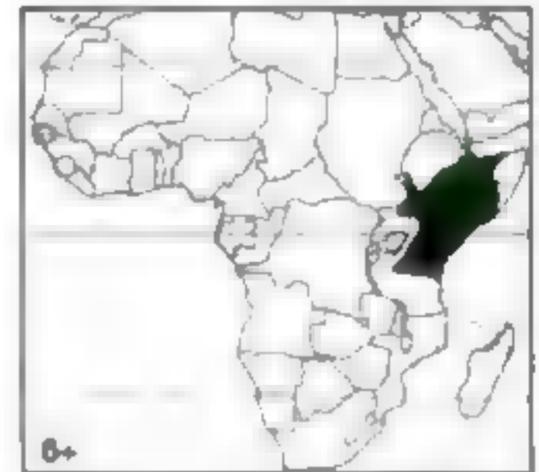
L49–55 cm (20 in): S96–110 cm (41 in): T21–25 cm (9 in): ♂85%

Dry thornbush, semi-desert, wooded grassland, to 2,000 m. Mid-sized accipiter-like hawk; broader wings, shorter graduated tail; wing-tips half down tail. Perches atop trees/poles; shallow straight-arm beats; glides/soars on flat wings, sometimes V. Solitary. Size/colour intermediate 104–106. [cf. 104ac]

**105a Adult (male)** Paler than 104a; more contrasting pale wings; rump white; eyes dark red, cere orange-yellow, feet orange. (Prey green tree-snake *Philothamnus irregularis*.) Flight (**105ax**): wing-tips blacker than 104ax, inner wings paler; white rump.

**105b Juvenile (female)** In flight. Browner than 104c, rump speckled; darker secondaries, lighter windows; eyes whitish, feet pale yellow.

Text and map page 511



### 106 Pale Chanting-goshawk *Melierax canorus*

L50–60 cm (22 in): S102–123 cm (44 in): T23–27 cm (10 in): ♂77%

Arid thornbush, scrub, desert, to 2,000 m. Paler, larger (esp. ♀), longer-legged than 104/105. Sluggish; hunts more on foot. Often thought conspecific with 105, but geographically isolated from it by 104. All chanting-goshawks named from *preu-preu-preu-pee-pee-pee...* when nesting. [cf. 104bd]

**106a Adult (female)** Pale blue-grey above to chest; white rump; much paler wings than 104b, whiter tail-sides; eyes brown, cere/feet orange-red. Flight (**106ax**: ♂): black-ended white underwings.

**106b Juvenile (male)** Richer brown than 104d, secondaries tipped buff; rump speckled; chest blotched, abdomen less clearly barred; eyes pale yellow, cere orange/black, feet dull orange-yellow.

Text and map page 512



### 107 Gabar Goshawk *Micronisus gabar*

L29–36 cm (13 in): S56–66 cm (24 in): T15–19 cm (7 in): ♂84%

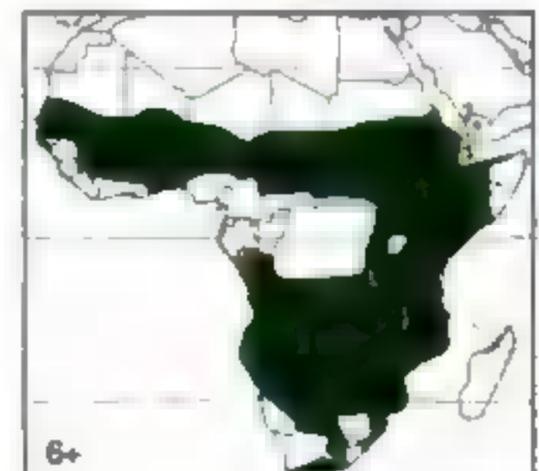
Thornbush, woodland, semi-desert scrub, locally urban areas, to 2000 m. Smallish accipitrine hawk; short wings, long rounded tail. Perches in canopy; flies among trees. Solitary/pairs. [cf. 143/113/135; b143/151]

**107a Adult (male)** (**107ax**: ♀) Grey, paler chest; barred abdomen; white rump and wing-bar; tail banded below; bare parts red. Flight (**107ay**: ♀): white rump, white-tipped banded tail; barred underwings.

**107b Dark adult (female)** Black; white tail-bars. Flight (**107bx**: ♂): black-banded white remiges below, with windows; 3 thin tail-bars.

**107c Juvenile (female)** Brown; white rump, 2 wing-bars, streaky head; creamy below, streaked/banded rufous or brown; eyes/cere yellow or grey, feet yellow. Flight (**107cx**: ♀): brown/rufous markings.

Text and map page 514





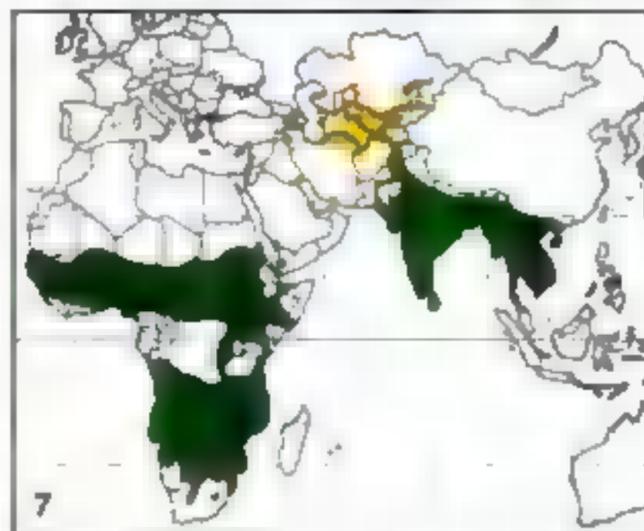
DAVID MASON

## PLATE 35: SMALLER AFROTROPICAL ACCIPITERS I

### 113 Shikra *Accipiter badius*

Text and map page 524

L25–35 cm (12 in): S48–68 cm (23 in): T12–18 cm (6 in): ♂71%  
Woodland, savannah, gardens, to 3,000 m (Asia 2,000 m). Small accipiter; wing-tips/tail rounded in Ind c/d/e, tail more pointed in smaller Afr a/b; small bill, shortish legs/toes. Flight as 145. Still-hunts from concealed perch. Solitary; noisy. [cf. 114; Afr 135/143/♂111; e107c; Ind 115/136/137/145]

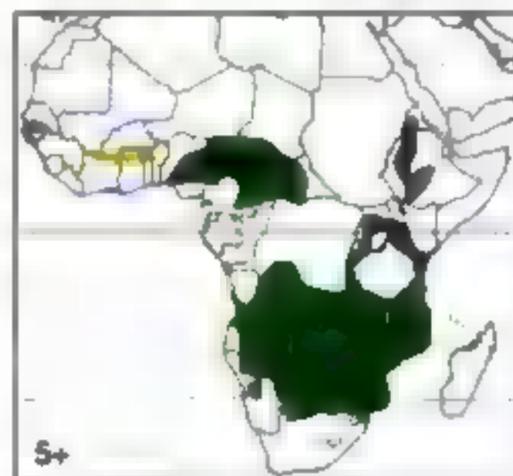


- 113a Adult (male) (*sphenurus*; W Africa/Tanzania)** Grey above; cream below, barred vinous; crissum plain, throat-stripe faint or absent; eyes orange-red. Flight below (**113ax**: ♂): linings as body; remiges variably all barred (secondaries less) to all plain (here faint-barréd on dark-tipped primaries, cf. 114). Flight (**113ay**: ♀): browner than ♂s (all races); wider browner bars below; all remiges barred, dark tips small; eyes yellow.
- 113b Adult (male) (*polyzonoides*; S from S Tanzania)** Thin grey/brown bars on white below; tail bolder-banded at sides, less pointed than a. Flight (**113bx**: ♀): from 143a by thin bars and shape.
- 113c Adult (male) (*cenchruides*; Iran/Kazakhstan/NW Pakistan)** Sandier-grey above; pale rufous barring and collar; clearer throat-stripe; usually white thighs. Flight (**113cx**: ♀): brown-barréd below.
- 113d Adult (male) (*dussumieri*; Pakistan/N India)** In flight. Intermediate a-c; slight collar/throat-stripe; barréd rufous on cream below, thighs/linings plain; remiges barréd, tail-bars wider-spaced.
- 113e Adult (male) (*poliopsis*; SE Asia)** Clearer grey head; heavy barring.
- 113f Juvenile (male) (*sphenurus*)** Streaky head; brown above, variably edged rufous; throat-stripe; dark rusty blotches/arrowheads below, flanks/belly more barréd. Flight below (**113fx**: ♀): linings spotted or barréd rufous; quills black-barréd (above also).

### 143 Ovambo Sparrowhawk *Accipiter ovampensis*

Text and map page 575

L31–38 cm (14 in): S60–75 cm (27 in): T15–19 cm (7 in): ♂67%  
Woods, savannah, plantations, to 1,800 m. Smallish accipiter; long rounded wing-tips, squared tail, small beaky head/face, short legs/long toes. [cf. a113/107/135; e107b; d146]

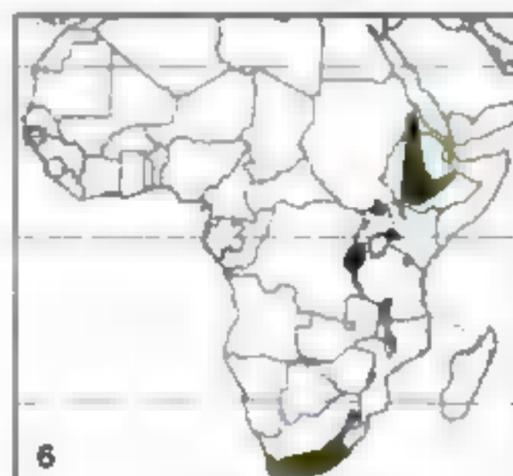


- 143a Adult male** Grey above, rump marked white; white-centred paler tail-bands; barréd grey/white below; eyes red. Flight below (**143ax**).
- 143b Adult female** In flight. Browner above, rump and white spots on tail as a; heavy bars below, barréd linings and banded quills as ax.
- 143c Dark adult (female)** Blackish-brown, but tail pattern as a/b. Flight (**143cx**: ♂): boldly banded quills as b (no windows, cf. 107bx).
- 143d Rufous juvenile (male)** Brown above, edged rufous; pale supercilia, dark cheeks; tail marks on shafts only (cf. 146); rufous below with shaft-streaks, or throat whitish, abdomen barréd.
- 143e Pale juvenile (female)** In flight. Whiter head; whitish below, variably barréd; linings barréd, quills more thinly barréd than a-c.

### 146 Rufous-breasted Sparrowhawk *Accipiter rufiventris*

Text and map page 581

L29–36 cm (13 in): S58–72 cm (26 in): T16–20 cm (7 in): ♂63%  
Forest, woodland, plantations, to 3,700 m. Smallish accipiter; structure as 145, sometimes treated as conspecific. [cf. 143de]



- 146a Adult male** Slate above, plain hood; broad tail-bands; all rufous below, or throat/belly white and breast/thighs rufous. (Prey: ♂ Red-billed Quelea *Quelea quelea*.) Flight below (**146ax**): linings pale rufous; whitish quills boldly banded blackish.
- 146b Adult female** In flight. Browner above; pattern below all much as a.
- 146c Rufous juvenile (male)** Dark brown above, some rufous edges; shafts on pale tail-bands may be as white as those on 143d; mostly rufous below, variably blotched and barréd cream, with dark shaft-streaks; still dark hood and rufous thighs (cf. 143d).
- 146d Pale juvenile (female)** In flight. Whitish below with rufous streaks, brown bars; quills as b; again dark hood/rufous thighs (cf. 143e).



## PLATE 36: SMALLER AFROTROPICAL ACCIPTERS II

### 135 Little Sparrowhawk *Accipiter minullus*

L:20–25 cm (9 in); S:39–52 cm (18 in); T:11–13 cm (5 in); ♂66%

Thornbush, savannah, woodland, forest, to 1,800 m. Tiny plump accipiter; short pointed wing-tips, short squared tail, tiny bill, long thin legs/toes. Retiring; moves from tree to tree; still-hunts, or chases birds among trees. [cf. 134/113]

**135a Adult male** Dark slate above; white rump, 2 rows of tail-spots and tip; white throat; brown-banded whitish below, washed rufous on flanks; eyes orange. Flight (135ax): linings rufous-buff, barred darker; 2–3 dark bands in mid tail, 6–8 bars at sides.

**135b Adult female** In flight. Larger; browner; only central tail-spots clear; bolder barring below, paler rufous flanks; eyes pale yellow.

**135c Juvenile (male)** Blackish crown; brown above, edged rufous-buff; dark tips on white rump; ghost tail-spots; whitish below, or pale rufous-buff (see ex), sparsely streaked on throat, blotched brown on breast/belly, and barred on flanks; eyes pale brown, cere/legs greenish-yellow. Flight (135cx: ♀): blotched body, black-spotted pale rufous wing-linings; quills much as ax.

Text and map page 561



### 134 Red-thighed Sparrowhawk *Accipiter erythropus*

L:22–27 cm (10 in); S:45–57 cm (20 in); T:10–13 cm (5 in); ♂59%

Forest, especially riverine and edges, locally wooded savannah, to 1,500 m. Very small plump accipiter; structure as 135, sometimes thought conspecific. Skulking; seldom in open or flying above trees. [cf. 112, 135]

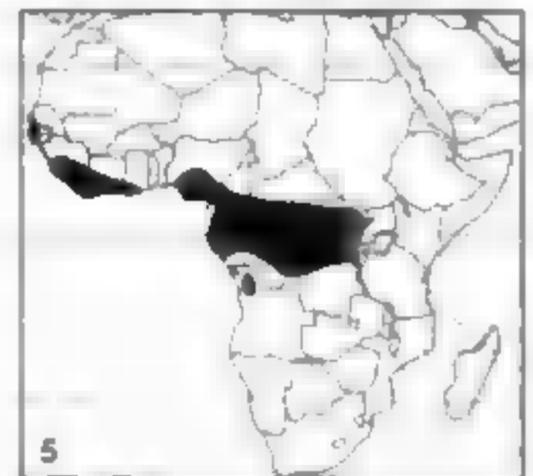
**134a Adult male** (nominate; Gambia/Nigeria) Slaty blue-black above, head and tail darkest; white rump, 3 broken rows of tail-spots (central missing, also no tip; cf. 135a); sharp white throat; grey below, washed dull pink on flanks and thighs; eyes red, cere/legs orange. Flight (134ax): linings white, fine-banded grey-brown; 3–4 dark bands on mid tail, 7–8 bars at sides.

**134b Adult female** (senegal; E/S from Cameroon) Blacker above, deep vinous below; central tail may show 1–2 spots, others less clear.

**134c Adult female** (nominate) In flight. Very like a; browner-black above; some faint barring below. (NB: spots hidden on closed tail.)

**134d Juvenile (male)** Dark brown above with variable rufous edges (often none); dark tips on white rump; ghost central tail-spots, others more buff-white; buff-white below barred grey-brown, more diffusely on pale rufous flanks; bare parts all deep yellow. Flight below (134dx: ♀): closely resembles 135a but for shorter tail with 3–4 bands; very different from 135c.

Text and map page 560



### 112 Chestnut-flanked Sparrowhawk *Accipiter castanilius*

L:28–37 cm (13 in); S:43–58 cm (20 in); T:13–17 cm (6 in); ♂63%

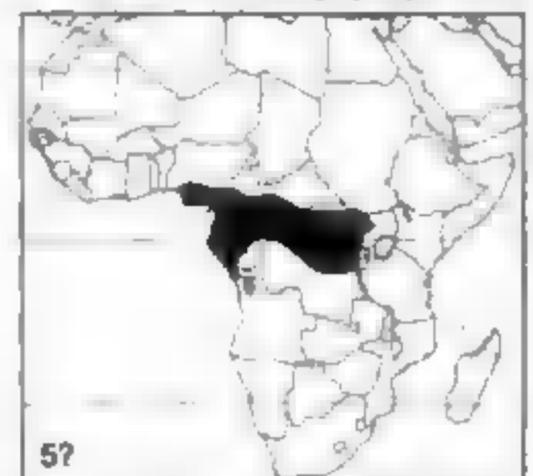
Lowland forest. Smallish accipiter (beniensis of E Congo c8% larger); short rounded wing-tips, long rounded tail, long legs/short toes. Skulks; rarely in open. [cf. 111, 134d]

**112a Adult male** Blue-black above, greyer on mantle and cheeks; 3 white spots on middle of obscurely banded tail; white below, finely barred grey on throat and boldly barred rufous on central breast/belly, but flanks and thighs plain rufous; eyes red. Flight below (112ax): wing-linings white, sparsely barred grey; secondaries almost plain; 3 dark bands in mid tail.

**112b Adult female** In flight. Tail-spots less distinct; chestnut flanks darker; barring brown, sharper; secondaries narrowly barred.

**112c Juvenile (male)** Dark brown above, faintly edged rufous/grey; whitish nape; ghost tail-spots; cream below with brown throat-stripe, drop-marks, flank-bars; bare parts green-yellow. Flight below (112cx: ♀): linings white, few dark spots; 4 mid tail-bands.

Text and map page 523





135a

135b

135c

134a

135c

135a

134c

134d

134a

134d

112c

114b

112a

112b

112a

112c

PLATE 13

## PLATE 37: LARGER AFROTROPICAL ACCIPITERS

### 151 Great Sparrowhawk *Accipiter melanoleucus*

L40–54 cm (19 in): S77–105 cm (36 in): T19–27 cm (9 in): ♂69%

Forest, woods, plantations, to 3,700 m. Big accipiter (largest African species, but smaller than 153); rounded wing-tips, longish tail, slight crest, big bill, longish thick legs/toes. Flat beats and short glides; glides on flat wings; seldom soars. Takes prey in flight; will hunt outside forest, but perches mainly in canopy. [d111c/143c/107b; e228b; f111g]

**151a Adult male** (nominate; E/SE Africa) Black above; conspicuously white below, with blotchy black of flanks/thighs variably extending to sides of belly; eyes darkest red to yellow. Flight below (**151ax**): predominantly white but for blotchy black waistcoat and trousers, sparsely spotted wing-linings, banded quills.

**151b Adult male** (*temminckii*; W Africa/DR Congo) Smaller; flanks mottled.

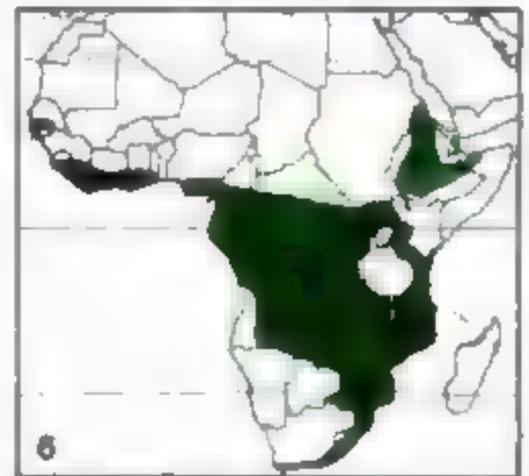
**151c Adult female** (nominate) In flight. Larger; brownish-slate above; browner on flanks; axillaries more barred; thinner bands on remiges.

**151d Dark adult (female)** (nominate) Black; white on throat, variably on belly/crissum/underwings; tail plain black-brown or banded.

**151e Rufous juvenile (male)** Streaky head, supercilia/nape paler; brown above, edged rufous; rufous below, streaked dark (esp. ♀s); tail dark grey-brown, barred blackish; bare parts grey/yellow.

**151f Pale juvenile (female)** In flight. As e, similarly streaked, but whitish below, not rufous; undertail on both dark-barréd rufous-grey.

Text and map page 592



### 111 African Goshawk *Accipiter tachiro*

L31–46 cm (15 in): S55–80 cm (27 in): T15–23 cm (7 in): ♂57%

Forest, plantations, parkland, to 3,000 m. Smallish to largish accipiter (much smaller than 151, ♂s of smallest races size of ♀ 113); very short rounded wing-tips, long tail, heavy bill, long thick legs/short toes. Often unobtrusive; early in day most easily seen African accipiter, soaring in display with sharp *whit*. Still-hunts. W races (e.g. **de**) often treated as a distinct species. [cf. 112/135; e151d/107b/143c]

**111a Adult male** (nominate; S Africa/Zimbabwe) Dark brownish-slate above, 3 central white tail-patches; closely barred rufous below, but throat mottled, crissum almost plain white; eyes golden.

**111b Adult male** (*sparsifasciatus*; Angola to Kenya/Somalia) Less clear tail-patches; browner barring below. Flight below (**111bx**): close brown barring on wing-linings, 4–5 blackish bands and dark tips on remiges; tail grey with 3 broad blackish bars.

**111c Dark male** (*sparsifasciatus*) Mainly black (browner breast/wings), with distinct grey bars on tail; much smaller than **151d**, with no white on throat or undertail-coverts; eyes green-grey.

**111d Adult male** (*canescens*; N DR Congo/W Uganda) Smaller; dark grey above, head pale blue-grey; 2 large white tail-patches; rufous-pink below with grey throat, white tail-coverts/wing-linings.

**111e Adult male** (*macrourides*; Senegal/W Cameroon) Again small; grey head, darker back; 3 clear white tail-patches; grey throat; bright rufous barring below, washed rufous on flanks/thighs.

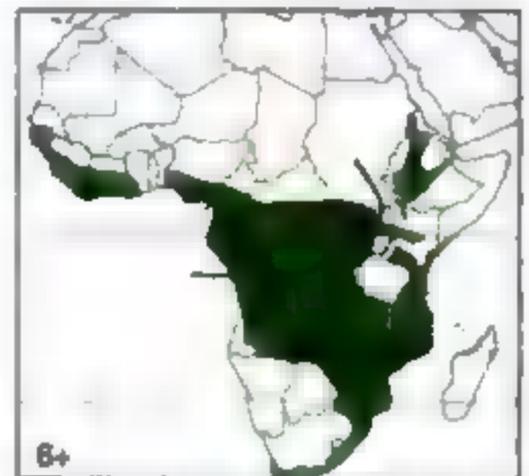
**111f Adult female** (*sparsifasciatus*) In flight. Much larger than **b**; heavier barring brown; greyer tail-patches less distinct [all races].

**111g Juvenile (male)** (nominate) Brown above, edged rufous-buff; whitish supercilia/nape; black-banded brown tail tipped buff; whitish below, black throat-stripe, sepia drops on breast, sepia (or mixed rufous) bars on flanks/thighs; bare parts green-grey.

**111h Juvenile (female)** (*sparsifasciatus*) In flight. Drop-shaped spots on buff-white wing-linings as breast; 4 blackish bars on tail.

**111i Juvenile (male)** (*canescens*) Blackish above; white below, few spots.

Text and map page 521





151d

151b

151a

151ax

151c

151e

151f

111bx

111c

111i

111g

111f

111h

111b

111a

111d

111e

## PLATE 38: ENDEMIC MALAGASY ACCIPTERS

### 152 Henst's Goshawk *Accipiter henstii*

L52–62 cm (22 in): S86–100 cm (37 in): T24–29 cm (10 in): ♂65%

Humid forest/edges, wooded savannah, scrub, to 1,800 m. Large accipiter like 153; short rounded wing-tips, long tail, big bill, long stout legs/toes. Unobtrusive, but soars in display. Probably mainly still-hunts. [cf. especially 88; perhaps 144]

**152a Adult male** Brown-slate above; slight speckled supercilia; obscure tail-bars; white below, barred blackish from chin to thighs and crissum. Flight below (152ax): bars sparser on crissum; wing-linings well barred; grey remiges dark-tipped, faintly banded; dark central bands, wider subterminal, on grey tail.

**152b Adult female** In flight. Barring coarser; remiges clearly darker below.

**152c Juvenile (male)** Brown above, edged rufous-buff; thin brown bars on blackish tail; whitish to pale rufous below, boldly streaked and blotched dark brown. Flight below (152cx: ♀): streaked body but linings barred, remiges and tail clearly banded.

Text and map page 594



### 144 Madagascar Sparrowhawk *Accipiter madagascariensis*

L30–42 cm (14 in): S50–69 cm (23 in): T13–20 cm (6 in): ♂53%

Forest, wooded savannah, scrub, to 1000 m (1500 m). Small/mid-sized accipiter like tiny thin-legged 152; short rounded wing-tips, medium squared tail, small bill, long thin legs/toes. Perches hidden; still-hunts or drops on prey in flight. [cf. 117]

**144a Adult male** Brown-slate above; obscure tail-bars; cheeks greyish; white below, barred blackish, but throat streaked, crissum almost plain. Flight below (144ax): white crissum; barred linings; pale-based greyish quills clearly barred (cf. 152ax).

**144b Adult female** In flight. Much larger; browner with darker head/cheeks, heavier-banded below.

**144c Juvenile (male)** Brown above, edged rufous; banded tail; cream below, streaked brown, thinly on throat. Flight (144cx: ♀): barring on flanks, crissum spotted; linings streaked, quills as a/b.

Text and map page 577



### 117 Frances's Sparrowhawk *Accipiter francesii*

L21–29 cm (10 in): S40–54 cm (19 in): T10–16 cm (5 in): ♂70%

Forest, wooded savannah, scrub, coffee, to 2,000 m; in Comoros also in cultivation, mangroves. Tiny small accipiter; short pointed wing-tips, long tail (b-d shorter), heavy bill, long thin legs/short toes. Forms in Comoros are sometimes treated as a distinct species: b/c resemble a, d more like e; unlike e, ♀s of all 3 resemble ♂s. Very confiding; perches in open; still-hunts for prey on ground or on trees. [cf. 144a]

**117a Adult male** (nominate; Madagascar) Dark grey above, head paler; grey tail, blackish subterminal; white below, variably tinged buff to vinous, breast faintly barred rufous, grey. Flight (117ax): axillaries barred, linings plain; thin bars on grey-tipped, white-based remiges; tail grey with central bars/plain sides.

**117b Adult (male)** (*griveaud*; Grand Comoro) Smaller; 4 dark tail-bands; white below with faintly vermiculated salmon flush on breast.

**117c Adult (male)** (*pusillus*; Anjouan) White below, grey at breast-sides.

**117d Adult (male)** (*brutus*; Mayotte) Grey crown/nape; otherwise warm brown above; pale brown cheeks; white below, breast barred rufous.

**117e Adult female** (nominate) In flight. Larger; much browner above (paler than 144b), contrasting grey head; barred rufous-brown below, including thighs/wing-linings; bolder bars than a on remiges.

**117f Juvenile (male)** Rich brown above; streaky supercilia; nape; white below, barred (not streaked) brown. Flight (117fx: ♀): as e, but wider bars, rufous-tinged wings; tail, c10 thin tail-bars.

Text and map page 535





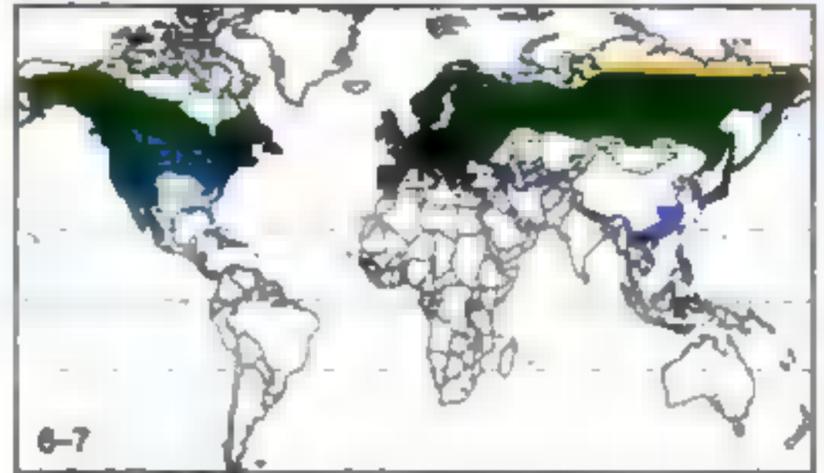
## PLATE 39: HOLARCTIC AND PALEARCTIC ACCIPITERS

### 153 Northern Goshawk *Accipiter gentilis*

Text and map page 595

L46–63 cm (21 in): S89–122 cm (42 in): T20–27 cm (9 in): ♂72%

Forest, taiga, woods, plantations, to 1,500 m (5,000 m). Large accipiter; long rounded wing-tips, big bill, short thick legs/toes; some ♂'s little bigger than 145d, but longer tapered wings, bulging secondaries, protruding head, pigeon-chest, broad rounded tail. Slower stiffer beats; short/long glides; tends to soar more with tail spread. [cf. Pal 145/Nea 149; 308; buteos]



**153a Adult male** (nominate; W Pal) Grey-brown above; blackish crown/mask, white supercilia; blackish bars/shaft-streaks below; eyes orange-red. Flight (153ax): often prominent fluffy crissum usually plain white; barred linings, faintly barred remiges.

**153b White adult male** (*albidus*; NE Siberia) Birds larger/paler clinally to N/NE; in far NE, half are white with pale brown markings.

**153c Adult male** (*atricapillus*; N America) Bluer; bolder head marks; grey vermiculations below, black shafts.

**153d Second-year female** (nominate) In flight. Browner; heavier bars; eyes yellow.

**153e Adult female** (*atricapillus*) In flight. Coarser barring, bolder streaks. Red eye (also on ♂).

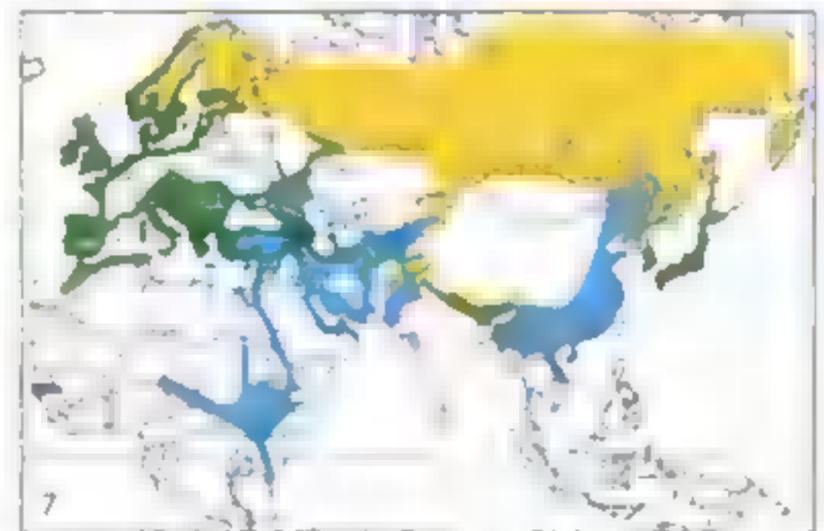
**153f Juvenile (male)** Dark brown above, edged buff/rufous; often facial ruff; below, rufous-buff (f) to white (fx), dark-streaked; eyes green-grey, then yellow. Flight below (153fx: ♀): linings streaked; quills pale rufous/white, clearer bars on remiges.

### 145 Northern Sparrowhawk *Accipiter nisus*

Text and map page 578

L28–40 cm (13 in): S56–78 cm (26 in): T13–19 cm (6 in): ♂61%

As 153, also scrub, urban parks, to 4,500 m. Smallish accipiter; rounded wing-tips (shorter arms/longer hands than 153a), longish squared/notched tail, long thin legs/toes, small head. Light beats; short glides. [cf. 153/114/113/115/136/137]



**145a Adult male** (nominate; most W Pal) Slate to blue-grey above; rufous cheeks; barred rufous to brown below, or solid rufous (ax); eyes orange-red. Flight below (145ax): almost plain white crissum; barred rufous-buff linings, banded greyish tail.

**145b Adult male** (*wolterstorffi*; Corsica; Sardinia) Small, dark.

**145c Adult male** (*melaschistos*; Himalayas/W China)

Large; dark slate above; clearer rufous bars below.

**145d Adult female** (nominate) In flight. Grey-brown; white supercilia; streaky rufous cheeks; dark-banded below, flanks often rufous; quill barring clearer than similar-sized 153ax; eyes yellow-orange.

**145e Juvenile (male)** Brown, edged rufous; supercilia and nape whitish; spotted/streaked on cream/pale rufous below, abdomen barred; eyes yellow. Flight (145ex: ♀): fewer tail-bars than 114ex.

### 114 Levant Sparrowhawk *Accipiter brevipes*

Text and map page 528

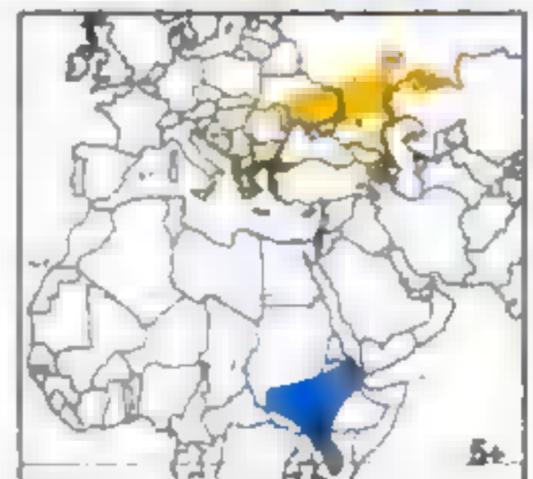
L30–37 cm (13 in): S60–74 cm (26 in): T14–19 cm (6 in): ♂80%

Open woods, steppe, riverine trees, orchards, scrub, to 500 m (2,000 m). Mid-sized accipiter; longish pointed wings more falcon-like, rounded tail. Slower beats; less dashing flight. Soaring migrant flocks. [cf. 113/145/275a]

**114a Adult male** Blue-grey above; plain mid tail; grey cheeks; thinly barred pale rufous below; eyes red-brown. Flight (114ax): black-tipped whitish wings (cf. 113); thin side-bars on tail.

**114b Adult female** In flight. Supercilia slight/absent (cf. 145d); brown-grey above and cheeks; barred rufous/pale brown below; wings paler than 145d, dark-tipped; mid-tail plain but for subterminal.

**114c Juvenile (male)** Dark brown; pale streaky head (more as a/b by Apr); throat-stripe, bold drops/bars below; eyes yellow-grey/brown. Flight (114cx: ♀): paler below than 145ex, but boldly marked linings, dusky wing-tips/trailing edges, more tail-bars.





153a

153e

153b

153d

153f

153c

153g

153h

145e

145a

145e

145a

145d

145b

114c

114a

114a

114b

114c

DAVID MEAD

114c

## PLATE 40: EAST PALEARCTIC AND INDOMALAYAN ACCIPITERS

### 136 Japanese Sparrowhawk *Accipiter gularis*

L29–30 cm (10 in): S46–58 cm (20 in): T11–14 cm (5 in): ♂66%

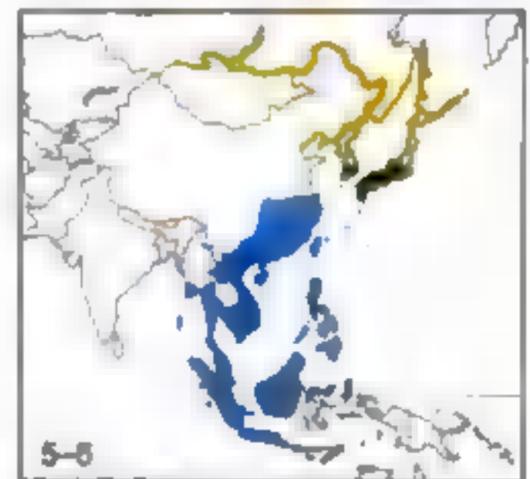
Forest, urban parks, to 1,800 m; winter open country, too. Tiny accipiter; long pointed wing-tips, shortish tail, long thin legs/toes. Fast beats; surprise/pursuit hunter. Migrant flocks. Sometimes treated as conspecific with 137, but differs in structure/sexual dimorphism. [cf. 113/115/137/145; island spp]

**136a Adult male** Blackish-slate above, white on nape; 4 bands on grey tail; brown-grey cheeks; obscure stripe on white throat; whitish below, variably barred grey-brown and washed rufous; eyes orange to red. Flight below (**136ax**; paler ♂): only faint rufous wash at chest-sides, more distinct grey-brown bars on flanks and wing-linings; remiges thinly but clearly banded.

**136b Adult female** In flight. Browner above; no rufous below; throat-stripe slightly clearer; white body/linings all barred grey-brown.

**136c Juvenile (male)** Dark brown above, edged buff/rufous; supercilia/nape whitish; thin tail-bars (cf. 137f); cream below, rufous/brown chest-streaks, belly-spots, side-bars; usually throat-stripe; eyes brown. Flight (**136cx**; ♀): linings barred rufous/brown.

Text and map page 563



### 137 Bessa *Accipiter virgatus*

L24–36 cm (12 in): S42–65 cm (21 in): T11–17 cm (6 in): ♂60%

Broken forest, 300–2200 m (3440 m); also winters lowland groves. Tiny to smallish accipiter; nominate and d/e structured as 136, but a-c short pointed wing-tips. Surprise/pursuit; also still-hunts. Solitary. [cf. 113/115/136/145; island spp]

**137a Adult male (bessa; S India/Sri Lanka)** Slate-grey above, white on nape; 3 dark bands on grey tail; white below, throat-stripe clear, chest mottled brown/rufous; rufous barring on breast and thighs, wash on flanks; eyes yellow/red, cere green-grey/yellow.

**137b Adult male (vanbeunmelt; Sumatra)** Darker above than a; throat buff; more solid rufous below with fine black streaks on chest.

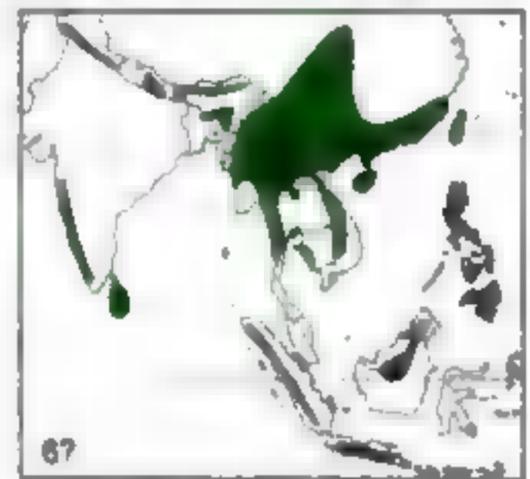
**137c Adult male (confusus; Philippines)** Paler bluer-grey head; 3 narrow bars on tail; throat-stripe faint and broken; almost solid vinous below, but thighs all grey or barred grey (cf. 142).

**137d Adult male (affinis; Himalayas/Vietnam)** In flight. Largest race; less rufous, more barred; wing-linings of all races white with rufous wash, barred blackish; bold dark bands on remiges.

**137e Adult female (affinis)** In flight. Browner above; streaked black on mid-chest (extends throat-stripe); boldly barred rufous below.

**137f Juvenile (male) (affinis)** Can be very like smaller 136c, but more boldly marked below, broad tail-bands diagnostic; some washed rufous below as here; eyes green-grey. Flight below (**137fx**; paler ♀): boldly marked body and especially thighs (cf. 136cx/115cx).

Text and map page 565



### 115 Chinese Sparrowhawk *Accipiter soloensis*

L25–30 cm (11 in): S52–62 cm (22 in): T12–14 cm (5 in): ♂89%

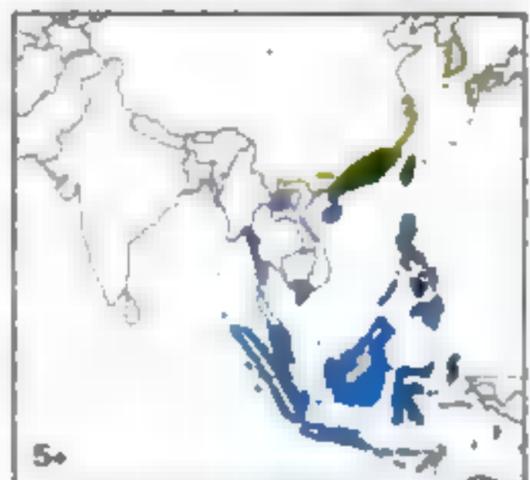
Woods by ricefields/swamps, to 1,000 m (1,500 m). Small accipiter; long pointed wing-tips, short tail, short legs/toes. Can hover; specialist feeder on frogs/lizards/waterside insects; still-hunts or glides/stoops. Migrant flocks. [cf. 113/136/137]

**115a Adult male** All blue-slate and white, washed/faint-barred pink, buff or grey on chest/flanks; eyes red. (Prey frog *Rhacophorus*.) Flight below (**115ax**): wings white, tipped blackish (cf. 114).

**115b Adult female** In flight. Little larger; browner; more strongly washed and faintly barred rufous-tawny on breast/flanks; underwings creamier with browner tips, sparse barring on some primaries.

**115c Juvenile (male)** Much as 136c; thin-banded tail; slightly redder streaks/arrowheads/bars below; head darker or greyer. Flight (**115cx**; ♀): wing-linings plain buff/pale rufous, faint bars on axillaries; dusky wing-tips, thinly barred remiges.

Text and map page 531





## PLATE 41: INDOMALAYAN AND ENDEMIC SULAWESI ACCIPITERS

### 116 Nicobar Sparrowhawk *Accipiter butleri*

L28-34 cm (12 in): S50-57 cm (21 in): T13-16 cm (6 in): ♂80%?

Car Nicobar/Katchall forest endemic. Small accipiter; short wing-tips, medium tail, heavy bill, short toes. Often treated as race of 113, but structure, plumage and ecology distinct; forms complex with 113-115. Still-hunts, especially lizards. [cf. 113/136/137/145, especially winter]

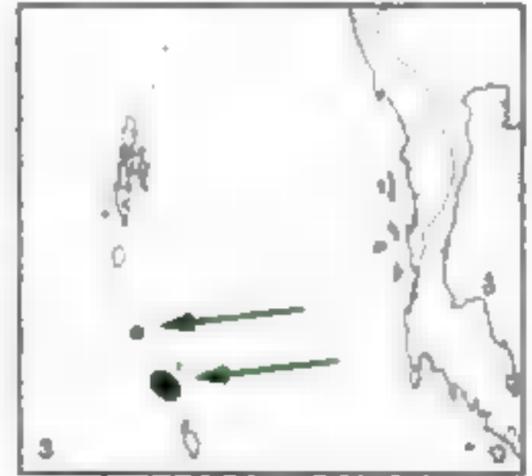
**116a Adult male** (*obsoletus*; Katchall) Blue-grey above; paler nape/cheeks, whitish supercilia/lores; plain tail with faint subterminal bar; white below, finely barred pale fawn on chest; eyes red.

**116b Adult male** (nominate; Car Nicobar) Flight below. Smaller; head less pale; throat grey-white; chest-bars pale rufous; eyes orange. Both races: white wing-linings, greyer remiges with darker tips and adjacent mottling; obscure subterminal tail-bar.

**116c Adult female** (nominate) Browner above; clearer red-brown chest-bars.

**116d Juvenile (male)** (nominate) Rich chestnut above, feathers dark-centred; mid and subterminal tail-bands; rufous-buff below, streaked and vaguely blotched dark red-brown; eyes whitish, cere pale green. Flight below (**116dx**: ♀): wings buff, streaked rufous on linings, thinly dark-banded on remiges; 2 tail-bars.

Text and map page 533



### 109 Crested Goshawk *Accipiter trivirgatus*

L30-46 cm (15 in): S54-79 cm (26 in): T14-21 cm (7 in): ♂73%

Broken forest, to 2,400 m. Mid-sized/large but slim-looking accipiter; short rounded wing-tips, medium tail, heavy bill, short sturdy legs/toes; crest like 11, but wing-tips barely exceed tail-base. Still-hunts. [cf. 11/153; 137ef/145de]

**109a Adult male** (*indicus*; mainland, bar S India) Brown above; blackish crown, grey cheeks; banded tail, whitish line on coverts; dark median and lateral stripes on white throat; chest washed rufous and streaked darker, abdomen/flanks barred brown to chestnut, thighs more finely barred blackish. Flight below (**109ax**): wing-linings white to buff, spotted brown; remiges tinged grey-brown towards tips and boldly banded; white crissum contrasts with streaked, barred body and banded tail.

**109b Adult male** (*layardi*; Sri Lanka) Smaller; cheeks browner; chest less rufous and darker-streaked; abdomen more boldly barred.

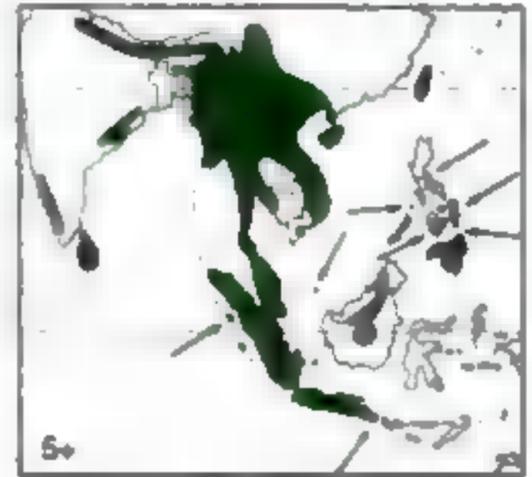
**109c Adult male** (*microstictus*; Borneo) Size intermediate; chest heavily blotched to almost solid rufous; abdomen line-banded rufous.

**109d Adult male** (*indicus*) In flight. Brown cheeks; heavier brown markings.

**109e Juvenile (male)** (*indicus*) Paler grey-brown above, banded blackish and tipped whitish; rump broadly tipped; crown/small crest edged buff; cream/rufous below, more lightly streaked/spotted, but thighs still finely barred. Flight (**109ex**: ♀): wing-linings washed pale rufous; quills much as a; but crissum speckled.

**109f Juvenile** (*layardi*) Flight below. More rufous than **ex**; unmarked but for blobs on flanks, spots on thighs; reduced wing-bands.

Text and map page 518



### 110 Sulawesi Crested Goshawk *Accipiter griseiceps*

L28-37 cm (13 in): S51-65 cm (23 in): T13-17 cm (6 in): ♂74%

Forest, open woodland, mangrove, to 2,000 m. Smallish/mid-sized accipiter; shape as 109, less crest. [cf. e142/118/138/115/136 imms]

**110a Adult male** Richer brown than 109a; head grey; fainter tail-bands, plain coverts; white below, central throat-stripe, boldly streaked breast/flanks, barred thighs, plain crissum. Flight below (**110ax**): white linings; greyish remiges sparsely barred; near-plain outer tail with obscure subterminal band.

**110b Adult female** In flight. Bolder markings; some spots on wing-linings.

**110c Juvenile (male)** Richer brown than 109e, edged rufous; tail-bands wider; clearer than a; below, fine rufous/brown streaks with black shafts; thighs spotted. Flight (**110ex**: ♀): body not so heavily marked as a/b; linings plain; remiges darker-tipped.

Text and map page 520





## PLATE 42: ENDEMIC SULAWESI ACCIPITERS

### 142 Vinous-breasted Sparrowhawk *Accipiter rhodogaster*

L26–33 cm (12 in): S46–62 cm (21 in): T12–16 cm (6 in): ♂59%

Forest, broken country, mangrove, to 2,000+ m. Small/smallish accipiter very like 138; shape similar apart from longer toes, but far greater RSD, so ♀s more clearly bigger. Eats birds/insects. Probably related to 139–141, resembling 118/138 by convergence.

**142a Adult male** (nominate; Sulawesi) Slaty-black above; barred grey tail (no white spots); cheeks grey; throat also, or grey-mottled white; breast vinous, shading to grey; white abdomen; eyes/feet yellow, cere yellow-green. Flight (142ax): grey-mottled cream linings; dark-barred grey quills. Slight variations in size, colour and especially cheeks: paler grey in *butonensis* (Muna/Buton); tinged vinous and on to hindneck in *sulaensis* (Peleng/Sula).

**142b Adult female** (nominate) Far larger; much as a, sometimes duller above, washed brownish; throat/thighs greyer; breast paler vinous. Flight (142bx): linings more spotted, remiges browner-tinged.

**142c Juvenile (male)** (nominate) Rufous above, spotted/barréd black-brown; blackish crown, some white on nape; banded paler rufous tail; tawny-buff below, with dark throat-stripe, streaked breast and spotted thighs. Flight below (142cx: ♀): axillaries all barred, linings spotted; rufous-washed quills boldly banded

Text and map page 573



### 138 Sulawesi Small Sparrowhawk *Accipiter nanus*

L23–28 cm (10 in): S44–54 cm (19 in): T11–14 cm (5 in): ♂70%

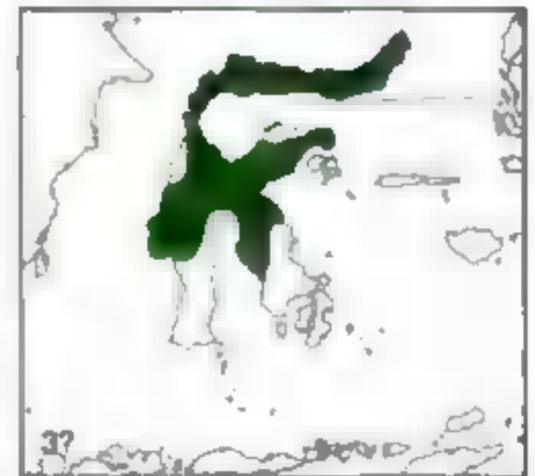
Mountain forest, 550–2,000 m. Tiny accipiter; short rounded wing-tips, short square tail, heavy bill, long thin legs/toes. Agile flight among trees for insects/small birds. Probably related to 137c, resembling 118/142 by convergence.

**138a Adult male** Blackish above; dark grey tail dimly barred, 3 white spots on inner webs of 12–14; streaked white throat; vinous below, cheeks/thighs grey, crissum white; eyes/feet yellow-orange, cere greenish. Flight (138ax): buff linings often stippled; barred remiges; grey tail, broken white bars.

**138b Adult female** In flight. Black duller; breast cinnamon, abdomen greyer.

**138c Juvenile (male)** Plain rufous above; dusky head edged rufous, some white on nape; tail banded blackish; creamy below, sparsely but boldly streaked blackish on breast/flanks; eyes/cere yellow-green, legs pale yellow. Flight below (138cx: ♀): linings washed rufous, slightly streaked; banded rufous-grey tail.

Text and map page 568



### 118 Spot-tailed Sparrowhawk *Accipiter trinotatus*

L26–30 cm (11 in): S45–51 cm (19 in): T12–14 cm (5 in): ♂85%

Virgin forest, dense mangrove, to 1,600 m. Small/smallish accipiter; short wing-tips, rounded tail, heavy bill, long legs, short toes. Big ♂s hardly smaller than small ♀s. Still-hunts reptiles/insects. Resembles 138/142 by convergence.

**118a Adult male** Blue-black above; black tail with white tip, and 2–3 white spots on inner webs forming broken bars; paler cheeks, grey/whitish throat; breast bright rufous-buff, shading to white on abdomen; eyes brown; red-brown, cere orange. Flight below (118ax): paler than 138/142, wings whitish, few bars on dark-tipped remiges; but tail blackish with 2–3 white bars.

**118b Adult female** In flight. Very similar to a; more barring on remiges.

**118c Juvenile (male)** Bright rufous above; dark crown edged rufous, mantle sometimes faintly spotted; tail as a, but browner and spots larger; cream/pale rufous below, streaked breast, flanks; eyes pale grey, brown, cere brown. Flight (118cx: ♀): white linings emphasise streaks on body; thin bars on remiges/outer tail.

Text and map page 536





## PLATE 43: ENDEMIC MOLUCCAN AND FIJIAN ACCIPTERS

### 141 Moluccan Sparrowhawk *Accipiter erythrauchen*

L26–33 cm (12 in): S47–65 cm (22 in): T12–16 cm (6 in): ♂56%

Forest, to 1,400 m. Small/smallish accipiter; medium pointed wing-tips, short tail, long legs/toes. Little-known bird-eater. Related to 139/140. [cf. a122 but larger; b121c]

**141a Adult male** (nominate; N Moluccas) Dark slate above, with clear dark rufous collar; tail faintly barred; dusky-speckled whitish throat; rufous-pink below, lower abdomen delicately tinted or greyish with obscure white bars; feet greenish-yellow. Flight below (141ax): linings and outer primary bases grey-rufous, barred darker; remaining remiges grey and barred; tail grey.

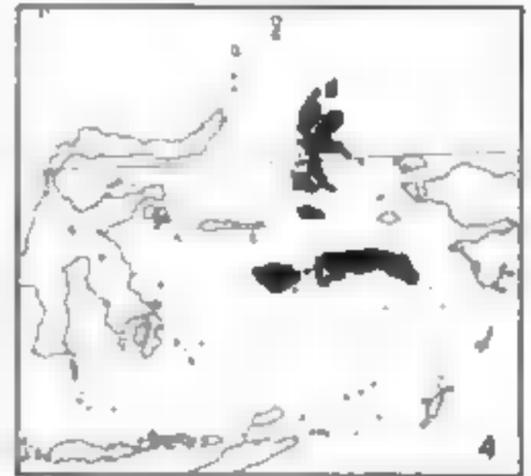
**141b Adult male** (*ceramensis*; Seram/Buru) Larger; blacker above; mainly pale warm grey below, pink flush on breast/breast-sides only.

**141c Adult female** (nominate) In flight. Body slightly darker/greyer than **ax**.

**141d Juvenile female** (nominate) Flight below. Wings rufous-grey, darker than body, and strongly streaked/barréd; tail-bars clearer below.

**141e Juvenile male** (*ceramensis*) Blackish above, with broad rufous edges [thinner in nominate race], especially on hindneck, where white also shows through; tail closely barréd; dark shaft-streaks on white throat; cream below, boldly streaked brown; feet as **a**.

Text and map page 572



### 127 Moluccan Goshawk *Accipiter henicogrammus*

L37–48 cm (16 in): S61–75 cm (27 in): T19–23 cm (8 in): ♂74%

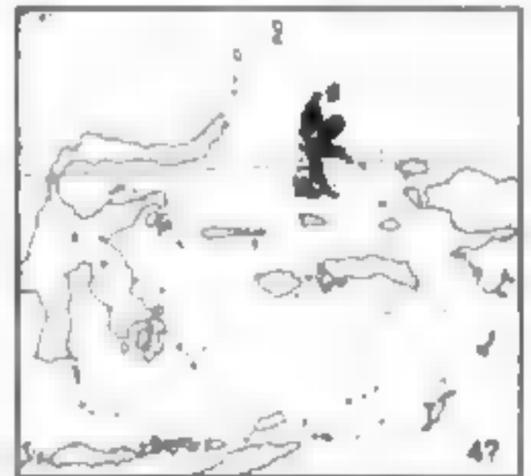
Halmahera/Morotai/Bacan: mountain forest, to 1300 m. Mid-sized to largeish accipiter; short rounded wing-tips, long tail, heavy bill, long legs/short toes. Little known. [122; c154c]

**127a Adult male** Dark blue-slate above, some white on nape; many obscure tail-bars; dark throat mottled white; chestnut below, thinly barréd white (or breast may be solid chestnut). Flight below (127ax): linings white-barréd chestnut as body; whitish-based grey remiges, all barréd darker; obscure bars on grey tail.

**127b Adult female** In flight. Much as **a** but for size; some browner above.

**127c Juvenile (male)** Blackish above, head streaked white, nape spotted black, back/wings edged rufous and barréd white/brown; many dark bars on paler tail; dark-spotted white throat; creamy below, barréd blackish on breast and more rufous on abdomen. Flight below (127cx; ♀): buff linings streaked/barréd brown; rufous-grey quills black-barréd, all remiges whitish-based.

Text and map page 551



### 125 Fiji Goshawk *Accipiter rufitorques*

L30–42 cm (14 in): S58–73 cm (26 in): T14–17 cm (6 in): ♂62%

Forest, open woodland, cultivation with trees, urban parks, to 1,200 m. Mid-sized accipiter; pointed wing-tips, short tail, heavy bill, stout legs/toes. Glides on flat wings, soars with tips upcurved. Bird-eater; still-hunts, surprise-flights or chases. Only other Fiji raptors 101/309.

**125a Adult male** Smoky-grey above with paler cheeks and vinous collar, unmarked tail; whitish throat with obscure central stripe; pale pink below, suffused light grey. Flight below (125ax): linings all plain pink-cream; silvery remiges plain but for dark-edged outer primaries; tail grey.

**125b Adult female** In flight. Darker greyish-pink below, some faintly barréd whitish; wing-linings darker/greyer, too; collar more rufous.

**125c Juvenile (male)** Brown above, edged rufous (esp. on nape as slight collar); grey-brown tail obscurely barréd; cream to rufous below, boldly streaked blackish and rufous, barréd on flanks; thighs barréd brown/rufous. Flight below (125cx; ♀): linings washed rufous, variable spots/streaks; quills lightly barréd.

Text and map page 549





141b

141e

141a

127a

141a

141d

141c

127b

127c

127a

127a

125a

125c

125b

125a

125a

DAVID MEAD

## PLATE 44: ENDEMIC NEW GUINEA ACCIPITERS AND ALLIES

### 157 Doria's Hawk *Megatriorchis doriae*

L51–69 cm (24 in): S88–106 cm (38 in): T25–31 cm (11 in): ♂65%

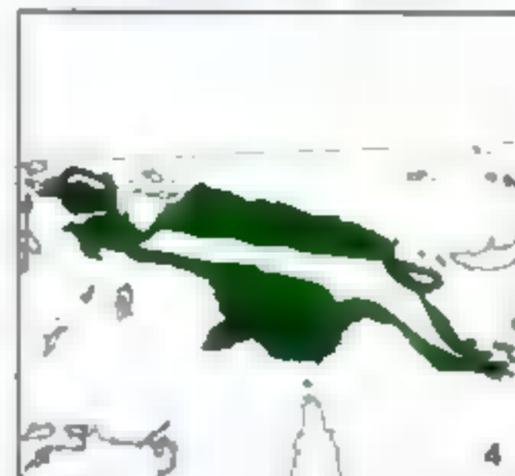
Forest canopy, mangrove, to 1,400 m (1,650 m). Large slim hawk; rounded wings, long rounded tail, small head, strong legs; wing-tips barely cover tail-base. Long treated as aberrant accipiter, but more kite-like in various ways. Stays mostly in canopy. Hissing whistle, long-drawn, descending. [cf. 16, 154/155, 215]

**157a Adult (male)** Streaky rufous/blackish crown, whitish supercilia, 'Osprey' mask; barred brown/blackish above, tipped rufous; tail close-barréd black/grey; cream below, streaked dusky/rufous; cere green to slate-blue, feet grey-yellow. Flight below (**157ax**: ♀): linings cream, all thinly streaked; dark-barréd greyish remiges white-based; tail barréd. Above (**157ay**: ♀).

**157b Juvenile (male)** Greyish ear-coverts streaked dark, but no mask like a; duller narrower barring above; deeper buff below with more diffuse streaking. Flight (**157bx**: ♀).

**157c Juvenile?** White head, black nape-spot; dark brown above, edged buff; white below, some blackish shafts.

Text and map page 605



### 155 Bùrgers's Hawk *Erythrotriorchis buergeri*

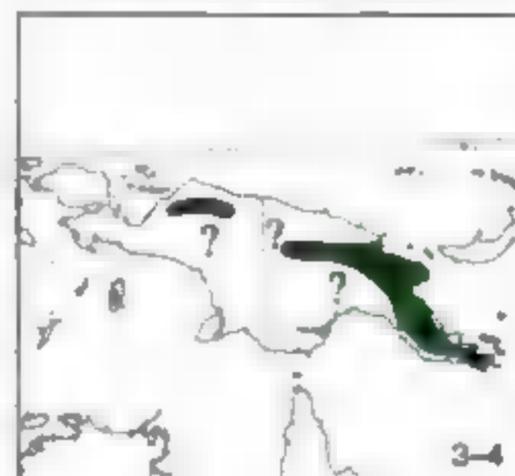
L43–53 cm (19 in): S85–109 cm (38 in): T21–25 cm (9 in): ♂78%

Hill/mountain forest, 450–1,600 m. Large hawk, usually placed in *Accipiter*, probably closer to 156; long rounded wings, medium tail. Noisy white soaring; high nasal upslur. [cf. 154]

**155a Adult (male)** Black above, shoulders boldly edged rufous, scapulars less so; tail obscurely barréd; below, white with black streaks, hearts/bars, rufous spots/bars on thighs. Flight below (**155ax**: ♂): linings as flanks; quills barréd white on dusky. Flight (**155ay**: ♀). [Also one known specimen of black morph.]

**155b Juvenile (male)** All rich rufous; black feather-centres above, bars on tail, streaks on head/below; bare parts greener. Flight below (**155bx**: ♀): linings as body; whitish crissum/tail-bars.

Text and map page 602



### 123 Black-mantled Goshawk *Accipiter melanochlamys*

L32–43 cm (15 in): S65–80 cm (29 in): T15–20 cm (7 in): ♂65%

Cloud forest, secondary growth, nearby cultivation, 1,100–3,300 m. Mid-sized accipiter; short pointed wing-tips, short tail, longish legs/short toes. [cf. 121a]

**123a Adult (male)** Glossy black above, including tail, but collar and underbody rufous-chestnut; eyes/legs yellow-orange. Flight below (**123ax**: ♂): linings as body; quills pale grey, tipped darker, sometimes with faint barring. Flight (**123ay**: ♀).

**123b Juvenile (male)** Blackish above, edged rufous, but for black-blotched white collar; tail faintly barréd; all dark-spotted cream to pink-buff below. Flight below (**123bx**: ♀): wings rufous-buff, thinly streaked; tail greyer; quills dark-barréd, grey-tipped.

Text and map page 546



### 130 Grey-headed Goshawk *Accipiter poliocephalus*

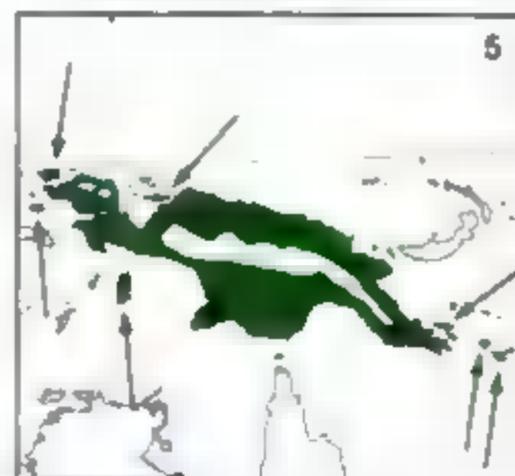
L30–36 cm (13 in): S56–65 cm (24 in): T15–17 cm (6 in): ♂80%

Forest, secondary growth, cultivation, to 1,500 m. Mid-sized accipiter; pointed wing-tips, heavy bill, longish legs; short toes. Does not soar. [cf. 121i]

**130a Adult (male)** Slate-grey above, head/mantle pale grey; white below, breast lightly washed or barréd grey; cere/legs red-orange. Flight below (**130ax**: ♂): linings white; whitish-based grey remiges thinly barréd; tail dimly barréd. Flight (**130ay**: ♀). [Also two reports of black morph.]

**130b Juvenile (male)** Dark brownish-slate above, thinly edged buff (or pale brown, broadly edged); mantle mottled white; tail obscurely barréd; creamy below, sparsely streaked; cere orange-yellow. Flight below (**130bx**: ♀): creamy linings; greyish quills all thinly barréd.

Text and map page 555





## PLATE 45: ENDEMIC NEW BRITAIN AND MELANESIAN ACCIPITERS

### 131 New Britain Goshawk *Accipiter princeps*

L38–45 cm (16 in): S75–86 cm (32 in): T18–21 cm (8 in): ♂72%?

Mountain forest, 750–1600 m (from 200 m). Largeish accipiter; short rounded wing-tips, short tail, heavy bill, thick legs/short toes. Only 5 adult specimens recorded, from Baining, Timoip and Talawe mountains; handful of recent sight records; juvenile not certainly known. [cf. 128/140/121/154]

**131a Adult male** Slate-grey above, sides of head/neck paler (not whole head as 130); crown/wings/tail darkest; white below, lightly washed or obscurely vermiculated grey at chest-sides; eyes orange, cere red-orange, legs yellow-orange. Flight below (131ax): linings and bases of remiges white or faintly grey-barred/mottled; tail grey, tips of remiges blackish.

**131b Adult female** In flight. Apparently much as a apart from larger size.

Text and map page 556



### 128 Slaty-backed Sparrowhawk *Accipiter luteschistaceus*

L28–36 cm (13 in): S55–65 cm (24 in): T14–17 cm (6 in): ♂72%

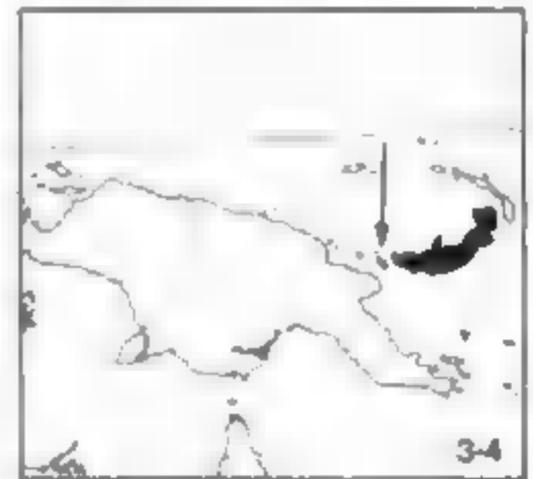
Forest, secondary growth, to 700 m. Smallish accipiter; short rounded wing-tips, short tail, big bill, long thin legs/short toes. [cf. 131/140]

**128a Adult male** Slate-grey above, crown darkest, mantle paler; cream to buff below, faint greyish bars on breast; eyes orange-yellow, cere/feet red-orange. Flight below (128ax): linings cream as body; remiges lightly barred grey/buff-white; tail dark grey.

**128b Adult female** In flight. Browner above; blacker crown/nape, still dark grey cheeks; buff below, rather clearer brown bars on breast.

**128c Juvenile (male)** Banded kestrel-like black/rufous above, including tail; blacker crown/nape edged rufous; cream below, heavily barred brown/rufous, but throat plain with thin median stripe. Flight (128cx ♀): linings as body; pale rusty quills barred.

Text and map page 552



### 140 New Britain Sparrowhawk *Accipiter brachyurus*

L27–34 cm (12 in): S50–62 cm (22 in): T13–15 cm (6 in): ♂65%?

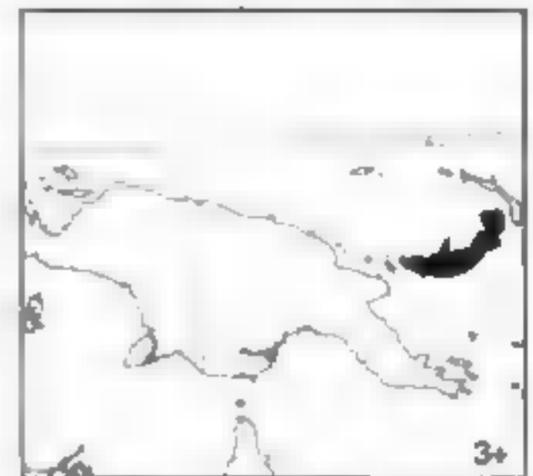
Forest, mostly montane, edge/clearings, to 1800 m. Smallish accipiter; pointed wing-tips, very short tail, fairly heavy bill, long thin legs/toes. [cf. 128]

**140a Adult male** Blackish-slate above, with clear-cut rufous collar; pale grey below, whiter on throat and belly/crissum; eyes red. Flight below (140ax): pale grey linings mottled darker; pale-barred remiges tinged rufous at base; tail plain grey.

**140b Juvenile (male)** Rufous above, blotched blackish, tail dark-barred; black crown edged rufous; buff below, marked brown. Flight (140bx ♀): linings as body; pale rusty quills barred.

**140c Immature? (female)** In flight. Banded brown above, tail dimly, head grever; rufous collar/bars on white breast/linings; eyes red.

Text and map page 571



### 126 New Caledonia Goshawk *Accipiter haplochrous*

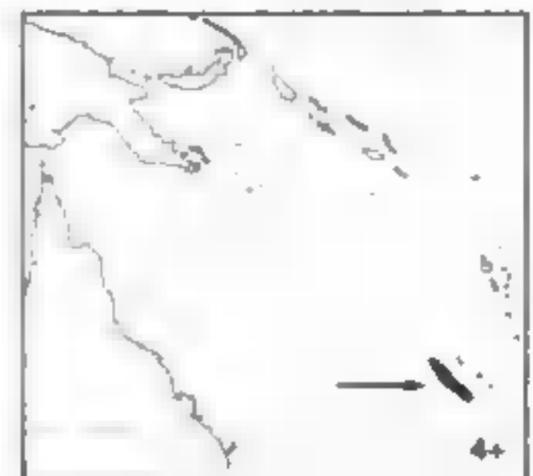
L32–40 cm (14 in): S58–74 cm (26 in): T14–18 cm (6 in): ♂65%

Forest/edge, savannah, to 1,300 m. Medium accipiter; pointed wing-tips, short tail, heavy bill, long thick legs/short toes. [cf. 119]

**126a Adult male** Slate-black above, darkest on crown; tail virtually plain; throat/chest also blackish, sometimes mottled/banded whitish; abdomen white; eyes red, cere yellow/dusky. Flight below (126ax): white linings and silvery secondaries contrast blackish head/chest and dark wing-tips. Ad ♀ flight (126ay): larger.

**126b Juvenile (male)** Black-brown above, edged buff/rufous; tail barred; cream/buff below, thighs pale rufous, all streaked/banded blackish. Flight below (126bx ♀): deep buff linings as body; pale slaty-cream tail and creamy remiges all thinly barred.

Text and map page 550





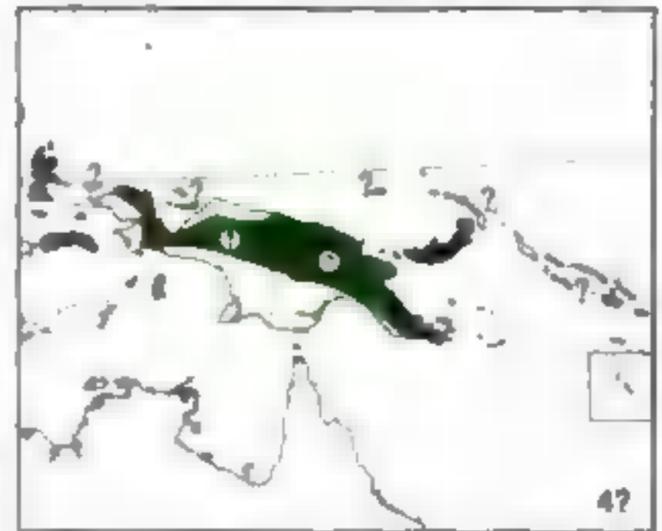
DAVID MEAD

## PLATE 46: ENDEMIC NEW GUINEA AND MELANESIAN ACCIPITERS

### 154 Meyer's Goshawk *Accipiter meyerianus*

Text and map page 600

L43–53 cm (19 in): S86–105 cm (38 in): T20–24 cm (9 in): ♂77%  
 Lowland/mountain forest, to 2,700 m. Large accipiter like 153; long rounded wing-tips, short tail, heavy bill, short strong legs/toes. Pigeon-like beats. Soar-hunts birds early; by day in cover. High nasal upslur *kyah*. [cf. 155; a124b♀]



**154a Adult (male)** Black above, some white on nape; tail faintly barred or plain; white below, variably barred brown-grey, some black shaft-streaks; usually shaft-streaked throat, plain crissum; eyes red-brown, cere greyish. Flight (154ax): lightly marked ♂ with unbarred grey quills; looks black; white at distance. Flight (154ay): more barred ♀ below; remiges faintly barred.

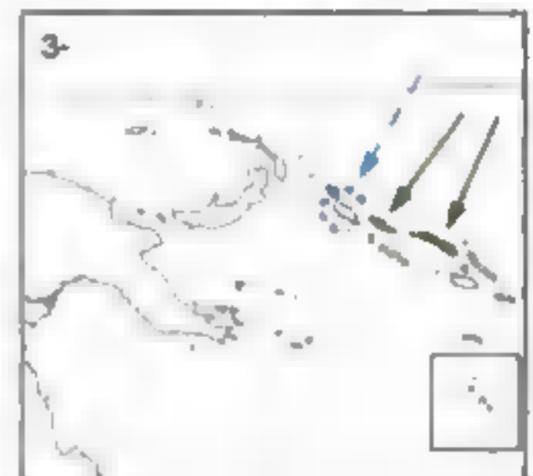
**154b Dark adult (male head)** Black but for white on nape; quill-bars may be less or more obvious than on a. Flight below (154bx: ♀).

**154c Juvenile (male)** Dark brown above, edged 'barred rufous' buff, most strongly on nape and rump; rufous supercilia; tail variably barred; rufous-buff below, streaked dusky. Flight below (154cx: ♀): linings as body; remiges obscurely barred.

### 129 Imitator Sparrowhawk *Accipiter imitator*

Text and map page 554

L28–33 cm (12 in): S53–63 cm (23 in): T13–16 cm (6 in): ♂80%?  
 Papua New Guinea (Bougainville) and Solomons (Choiseul, Santa Isabel, Makira) forest, to 1,000 m. Smallish accipiter; short rounded wing-tips, shortish tail, big bill, thin legs/short toes. [named for b124b]



**129a Adult (male)** Jet-black above; throat/chest black, abdomen white; eyes red-brown. Flight below (129ax: ♀): linings and primary bases white, latter dark-banded; rest of quills slate-black.

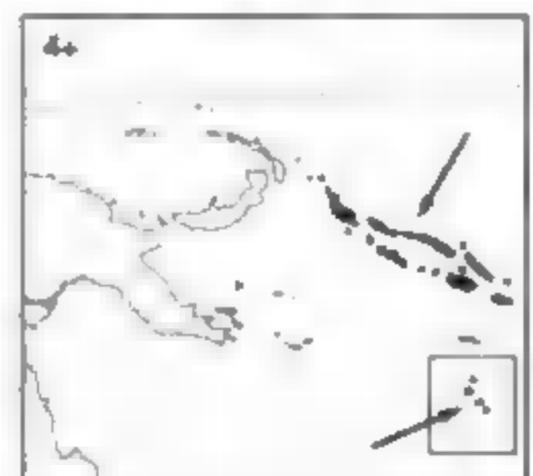
**129b Pale adult (male)** In flight, just as a except chest and dark-streaked throat white (cf. 124a/b shape, upperparts, underquills, eyes).

**129c Juvenile (male)** Dark brown above, edged rufous; crown distinctively mottled 'barred black, white; rufous collar mottled blackish; brown tail thinly barred; buff below, throat/breast finely barred rufous, abdomen/thighs plain or faintly vermiculated; eyes yellow. Flight (129cx: ♀): linings mostly plain buff; remiges whitish with close dark bars; tail thinly barred.

### 124 Pied Goshawk *Accipiter albogularis*

Text and map page 547

L33–43 cm (15 in): S60–80 cm (28 in): T15–20 cm (7 in): ♂62%  
 Forest/edge, secondary growth, gardens, to 1,800+ m. Mid-sized accipiter; long pointed wing-tips, heavy bill, longish thick legs/toes. Perches openly. Musical *ku-ku*. [124b see 129b]



**124a Collared adult male (woodfordi, Bougainville-Makira)** Blue-slate to grey above, blacker head, chestnut collar ends in rufous/grey smudges by white breast; eyes orange-yellow. Flight below (124ax: ♂): white linings; grey remiges with finely barred white bases; centre of grey tail faintly barred. [Collar brighter on *richhorni* (Feni), obsolete on *sharpri* (Santa Cruz).]

**124b Collarless adult male (woodfordi)** Head. No collar; sooty-smudged chest-sides. Flight (124bx: ♀): much as ax but bases of inner remiges stippled (not barred). [Nominate race (Makira) and *gilvus* (New Georgia group) similar, usually collarless.]

**124c Dark adult female (woodfordi)** In flight. Slate; paler remiges; eyes red.

**124d Juvenile (male) (woodfordi)** Rufous-brown above with cream collar, all spotted/banded blackish; cream to rufous-buff below, darkest on thighs, blotched blackish on breast, barred chestnut on flanks/abdomen. Flight (124dx: ♀): wings/tail all washed pale tawny/rufous; linings spotted blackish; quills thinly barred.

**124e Tawny juvenile (male) (woodfordi)** As d but chestnut (juvenile of c?).

**124f Juvenile (male) (gilvus)** Pale tawny below; sparser markings than d.



DAVID MEAD

## PLATE 47: AUSTRALASIAN ACCIPITERS

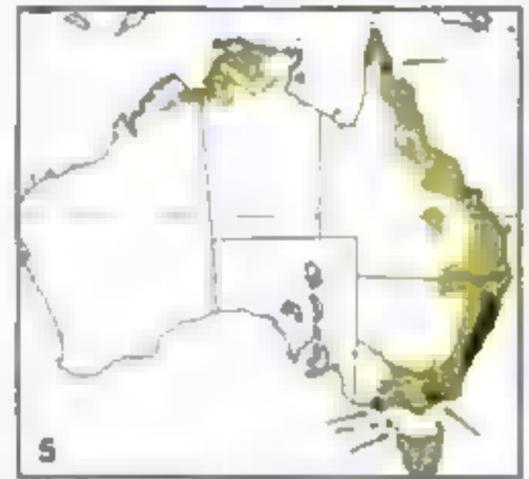
### 120 Grey Goshawk *Accipiter novaehollandiae*

L44–55 cm (19 in): S72–101 cm (34 in): T20–24 cm (9 in): ♂65%

Forest, to 1,500 m. Large accipiter; shorter, squarer tail, broader wings than 119; short rounded wing-tips, heavy bill, short thick legs/toes. Shallower, more laboured beats; glides on bowed wings. Solitary. [cf. 119; 300/26/27/12]

- 120a Grey adult (male)** Grey above, white below, breast finely barred; silvery tail obscurely barred (above, too); eyes red. Flight (120ax: ♀): linings white; remiges grey, bases white or faintly barred.
- 120b White adult (commonest S/W: ♀)** White; rarely odd grey feathers. Flight (120bx: ♂). [Juvenile same or faint tail-bars; eyes as c.]
- 120c Grey juvenile (male)** Browner neck, coarser V-bars below; tail-bars above/below; eyes brown, orange by 2-yr. Flight (120cx: ♀).

Text and map page 540



### 121 Varied Goshawk *Accipiter hiogaster*

L30–45 cm (15 in): S55–80 cm (27 in): T13–20 cm (6 in): ♂64%

Broken forest/edge, coconuts, savannah with trees, wetlands, cultivation, locally to 1,600 m. Small/medium accipiter; shape as 120 (but g/h wings longer/more pointed) and often treated as conspecific, sometimes 122 also. Very variable (20 races, but perhaps at least g/h group also distinct sp), though only a has colour morphs. [cf. 119/123/139; 115/124/128/129/131/136/140/141]

- 121a Adult male (leucosomus; New Guinea)** Second largest; grey/vinous-rufous; head paler, throat grey, sometimes abdomen. Flanks obscurely pale-barréd. Dark morph ♂ (121ax: flight): all sooty-brown, thigh chestnut. [White morph like small yellow-eyed 120b.]
- 121b Adult female (leucosomus)** In flight. Browner; more barred; less rufous below.
- 121c Adult (male) (nominate; Seram)** Small; slate above, chestnut below.
- 121d Adult (male) (pallidiceps; Buru)** Small; slate-grey above, but pale grey head/mantle; rufous below, but much paler throat/chest.
- 121e Adult (male) (dampieri; New Britain)** Smallish; pale, hint of pink collar; vinous-pink breast; paler abdomen.
- 121f Adult (male) (rufoschistaceus; Choiseul-Santa Isabel)** Larger; darker; grey throat.
- 121g Adult (male) (albiventris; Kai Is)** In flight. Small, wings pointed; pale grey above; pink breast and, variably, obscure collar, white abdomen; white linings, pale grey quills, wing-tips darker.
- 121h Adult (male) (sylvatrix; Lesser Sundas)** Much smaller, wings pointed, tail squared; medium grey above, evenly barred rufous; white below.
- 121i Pale juvenile (male) (leucosomus)** Brown above, thinly edged buff (edges soon abraded); tail obscurely barred; cream/buff below, breast streaked brown/rufous, abdomen barred. Flight below (121ix: rufous ♀): body, linings washed rufous, almost plain or obscurely marked red-brown.
- 121j Juvenile (male) (nominate)** In flight. White below, scattered dark spots.
- 121k Juvenile (male) (rufoschistaceus)** In flight. Darker; rufous collar trace; faint tail-bars; whitish below, breast-bars; linings cream.



Text and map page 541

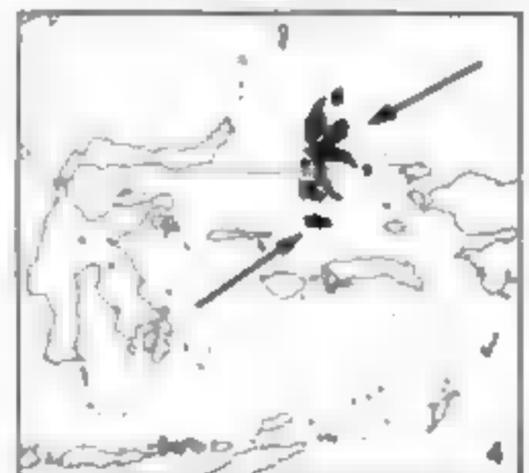
### 122 Grey-throated Goshawk *Accipiter griseogularis*

L35–48 cm (16 in): S60–85 cm (28 in): T15–21 cm (7 in): ♂60%

Forest, to 1,200+ m. Mid-sized accipiter; tail longer than 120. [cf. 127/141]

- 122a Adult male (nominate; C. Moluccas)** Slate-grey above, with variable rufous hind-collar; grey throat; rufous below. Flight (122ax): linings much as belly.
- 122b Adult male (moroti; Morotai)** Smaller; darker; clear rufous collar.
- 122c Adult female (nominate)** In flight. Browner above, tendency to clearer collar; tail sometimes obscurely barred; more barring below.
- 122d Juvenile (male) (nominate)** Blackish-brown above, faintly edged buff; head mottled white; tail barred black; cream below, broken throat-stripe, breast strongly spotted; streaked blackish, abdomen barred. Flight (122dx: ♀): linings, quills all barred.

Text and map page 545





## PLATE 48: AUSTRALASIAN ACCIPITERS AND RED HAWK

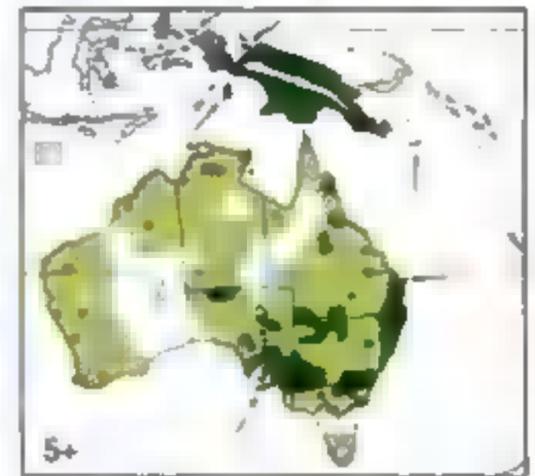
### 139 Collared Sparrowhawk *Accipiter cirrhocephalus*

127–38 cm (13 in): S53–77 cm (26 in): T13–16 cm (6 in): ♂62%

Forest, timbered gorges, wooded savannah, scrub, urban areas, to 2,500 m. Smallish accipiter; pointed wing-tips, long thin legs/toes; from 119 by more curved wings, squared or notched tail, smaller head, staring eyes, thin legs, longer middle toes. Jerky winnowing beats; glides on flat/slightly bowed wings; soars with tips up. [cf. 119; 121; 123/130]

- 139a Adult male** (nominate; Tasmania/most Australia) Grey head, rufous hind-collar; slate or washed brown above; tail thinly barred; closely barred rufous and white below. Flight below (**139ax**): linings finely barred rufous; remiges barred greyish.
- 139b Adult male** (*quersitandus*; N Australia) Slightly greyer above and paler all over. (Prey: Long-tailed Finch *Poephila acuticauda*.)
- 139c Adult male** (*papuanus*; New Guinea) Small; darker; bars more diffuse.
- 139d Adult female** (nominate) In flight. Larger; bars bolder and browner.
- 139e Juvenile (male)** Brown above, edged rufous, blotched/streaked white; whitish below, throat, chest heavily dark-streaked, abdomen barred; finely barred thighs washed rufous. Flight (**139ex**; ♀): linings, remiges and tail all tinged and finely barred.

Text and map page 569



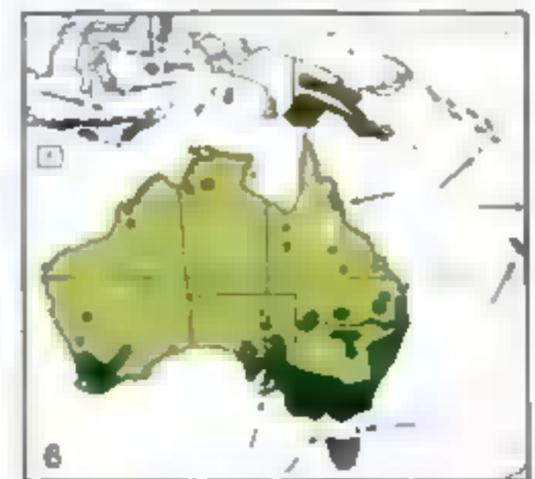
### 119 Brown Goshawk *Accipiter fasciatus*

133–55 cm (17 in): S60–98 cm (31 in): T15–26 cm (8 in): ♂65%

Open forest to urban parks, to 2,000 m. Medium-large accipiter; pointed wing-tips, long thick legs/short toes; as 139, but rear wing-edges less curved, head/neck and rounded tail longer; beetle-brows, thicker legs, shorter toes. Deep beats; glides on more bowed wings. [cf. 139; 123/130/136/141/154/155]

- 119a Adult male** (nominate; Tasmania/most Australia) Size much as ♀ 139; plumage similar. Flight (**119ax**): quills less heavily barred.
- 119b Adult male** (*didimus*; N Australia) Smaller; paler grey above, more rufous below; more pointed wings; tail squarer [but not on ♀].
- 119c Adult male** (*wallacei*; Lombok/Babar) Shorter-tailed; blue-grey/pink.
- 119d Adult female** (nominate) In flight. Much larger, browner; more barred.
- 119e Juvenile (male)** (nominate) As 139e but for shape/structure. Flight (**119ex**; ♀).
- 119f Juvenile** (*stresemanni*; Flores Sea) Smallest race (L30+ cm); adult much as e; juv more creamy-buff below, more mottled white above.

Text and map page 537



### 156 Red Hawk *Erythrotriorchis radiatus*

146–61 cm (21 in): S111–136 cm (49 in): T20–27 cm (9 in): ♂73%

Forest, woods, to 1000 m. Large hawk, size of small eagle; long wings tapered, longish squared tail, flat head, slight crest/facial ruff, big feet/long toes; wing-tips near tail-tip. May flap crow-like, but pursuit-flight fast, falcon-like, with deep fluid beats; glides on flat wings; soars in shallow V, edges parallel, tips upswept. Secretive. [cf. 274/35/101d, 36b/40/41e/91b/119j/231]

- 156a Adult male** Blackish above, edged rufous; slate-grey tail with dark sub-terminal, and variably barred; pale streaky head, throat, grey face; rufous below, breast, flanks streaked, thighs plain; eyes brown(ish), cere grey. Flight (**156ax**): rufous linings; whitish quills thinly barred, primaries dark-tipped.
- 156b Adult female** In flight. Build heavier, bill deeper; less rufous; primaries, tail more heavily barred; dark-streaked whitish below, rufous flanks/thighs, sometimes paler rufous chest; eyes yellow.
- 156c Juvenile (male)** Redder; wider edges above; rufous of head clearer than streaks; tail edged rufous at base, bars often broken; dark-streaked rufous below; cere pale blue, legs cream. (Prey: Rainbow Lorikeet *Trichoglossus haematodus*.) Flight (**156ex**; ♀): linings as body; head paler; diffusely grey primary tips.

Text and map page 603





139e

119a

139b

139c

119w

119a

119b

119c

139a

119d

119d

119j

119a

156a

139e

119e

156b

156c

156a

156c

## PLATE 49: NEARCTIC AND NEOTROPICAL ACCIPITERS

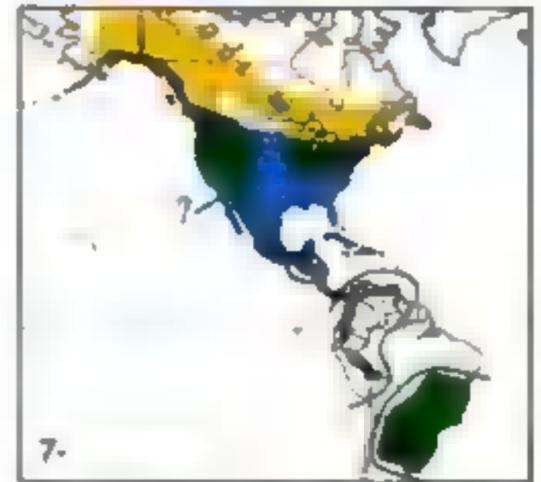
### 147 Sharp-shinned Hawk *Accipiter striatus*

123–35 cm (11 in): S42–68 cm (22 in): T12–19 cm (6 in): ♂54%

Broken forest, wood edge, to 3,700 m; esp conifer/mixed in N America; esp pines 350–2,600 m in C. America; esp cloud forest 300–3,000+ m in Andes; esp savannah woods/scrub to 1,800 m on plains of S America; c, d/e and f now often treated as distinct spp. Small/smallish slim accipiter; mid-length rounded wing-tips (d/e short), longish squared/notched tail (d/e longer), eyes central in small rounded head (cf. 149), long thin legs/toes. Buoyant fast beats; glides, soars on flat wings, wrists slightly forward, head projecting little. Secretive, mainly in canopy; hunts in open; a flocks on migration. [cf. 132/133/148/149 etc.]

- 147a Adult male** (*velox*; N America) Blue-grey above, crown often darker; equal pale/dark tail-bands, thin white tip; rufous cheeks; white below, finely barred rufous, throat streaked dusky, crissum plain; eyes orange/red. Flight below (147ax): linings finely barred rufous; remiges well barred; 3 dark tail-bands.
- 147b Adult male** (*vulturis*; most Mexico N to US border) Slightly larger; more diffusely barred below; flanks/thighs plain rufous.
- 147c Adult male** (*chunogaster*; S Mexico/Nicaragua) Blackish above; grey cheeks; plain white below, but thighs rufous-buff; eyes red.
- 147d Adult male** (*ventralis*; Venezuela/W Bolivia) Brown-slate; pale tail-bands thin; brown cheeks; white variably tinged barred rufous-buff below, throat streaked, flanks/thighs rufous; eyes yellow.
- 147e Dark adult male** (*ventralis*) Black-brown above; obscure tail-bands; slate-grey below, throat paler, cheeks/abdomen tinged chestnut.
- 147f Adult male** (*erythronemius*; E. Bolivia/S Brazil/N Argentina) Paler blue-grey above; pale tail-bands again narrow; white below, finely barred rufous-grey, flanks/thighs deep rufous; eyes yellow.
- 147g Adult female** (*velox*) In flight. Heavier barring; browner-grey above.
- 147h Juvenile (male)** (*velox*) Dusky-brown above, thinly edged rufous (but little/no white mottling, cf. 149c); thin supercilia, brown cheeks; white/cream below, streaks on breast usually bold and rufous (sometimes thin brown), with arrowheads on abdomen, bars on flanks, plain crissum; eyes yellow. Flight below (147hx; ♀): linings streaked, barred as body; quills as a.

Text and map page 583



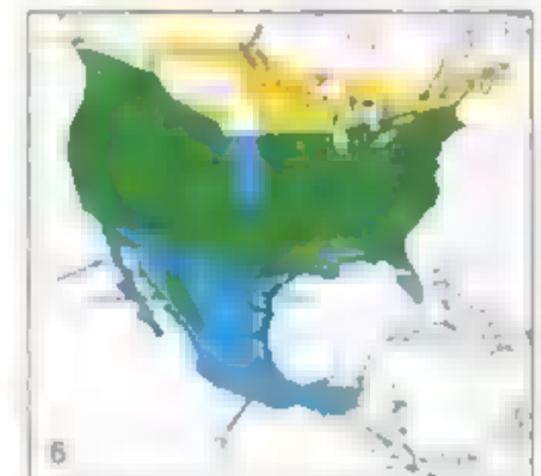
### 149 Cooper's Hawk *Accipiter cooperii*

137–47 cm (17 in): S64–87 cm (30 in): T18–24 cm (8 in): ♂68%

Forest edge, open woodland (esp. broadleaved/mixed), riverine groves, parks, to 3,000 m. Medium/largish stocky accipiter; smallest W ♂s little larger than ♀ 147, but longer rounded tail, eyes forward in big squarish head, sturdier legs/toes. Strong flight, stiff beats; glides on flat wings, wrists forward, head projecting; soars on flat or slightly raised wings, front edges nearly straight, head projecting still farther. Secretive, but in W perches more in open, even on poles; hunts in open. Solitary on migration. [cf. 147/153f]

- 149a Adult male** Blue-grey above; contrasting slaty-black crown, paler hind-collar; equal light/dark tail-bands, broad white tip; cheeks rufous or streaky brown; white below, barred rufous, throat streaked dusky, crissum plain; eyes red to orange. (Prev: Bobwhite *Colinus virginianus*.) Flight below (149ax): linings barred rufous, remiges well barred; tail dark-banded.
- 149b Adult female** In flight. Similar, clearly larger; browner-grey above.
- 149c Juvenile (male)** Brown above, edged buff, some white mottling; head darker-hooded, nape pale-streaked; often tawny cheeks, rarely pale supercilia; white below with thin brown streaks, plain crissum; eyes greenish-yellow. Flight (149cx; ♀): wing-linings thinly streaked as body; quills much as a.

Text and map page 588





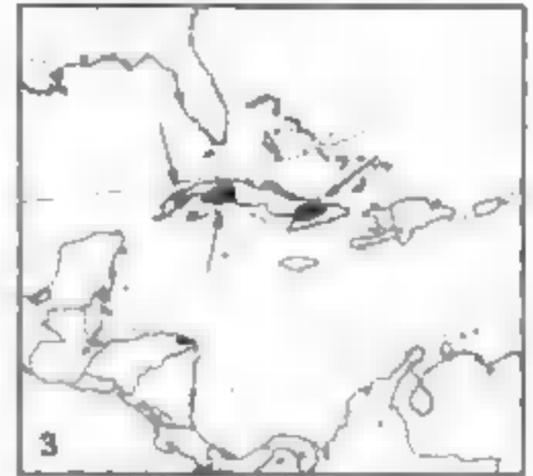
## PLATE 50: ENDEMIC CUBAN AND NEOTROPICAL ACCIPTERS I

### 150 Gundlach's Hawk *Accipiter gundlachi*

Text and map page 590

L40–46 cm (17 in): S74–84 cm (31 in): T20–24 cm (9 in): ♂76%

Forest/edge, open woods, mangrove, to 800 m. Largish stocky accipiter, shape as 149 with medium rounded wing-tips, long rounded tail, long thick legs/toes, heavier bill/claws. Sometimes treated as conspecific, but more realistic that both form superspecies with 148. Flight probably similar. Secretive; thought in 1960s to be near extinction, but now 300 estimated. [cf. 147]



**150a Adult (male) (nominate; W/C Cuba)** As 149, but cheeks and chest grey with brown wash; rufous lower breast, belly sparingly barred white; rufous thighs tipped white; cere dark grey. Flight (150ax; ♀): greyish, rufous and white body; white-barréd rufous wing-linings, barred remiges; tail obscurely banded.

**150b Adult (male) (wileyi; E Cuba)** In flight. [Paler grey above.] Cheeks and chest pure slate-grey; belly, flanks fine-barréd rufous/white; thighs also barréd; outer tail nearly plain; cere green-grey.

**150c Juvenile (female) (nominate)** In flight. Creamy-buff below with dark streaks and brown bars; more barréd flanks; linings streaked, barréd; quills much as b; cere greenish. [Darker brown above than 149c, edged more rufous; crown similarly darker than back.]

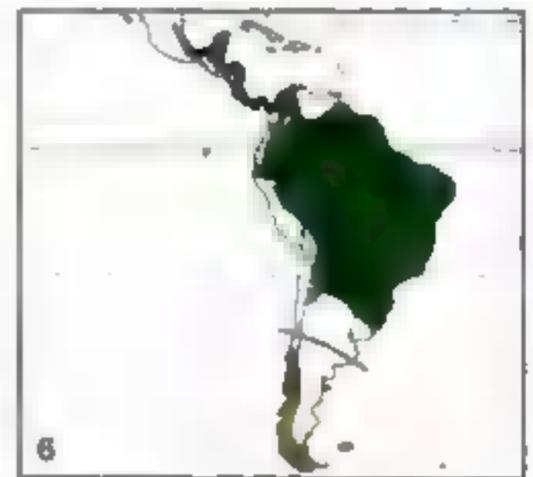
**150d Juvenile (male) (wileyi)** Much as c above; longer blacker streaks and fewer bars below, more heavily marked thighs; cere yellowish.

### 148 Bicoloured Hawk *Accipiter bicolor*

Text and map page 586

L34–45 cm (16 in): S58–83 cm (28 in): T17–23 cm (8 in): ♂55%

Forest clearings/edges, open woodland, savannah trees, scrub, plantations, to 2,000 m (2,700+ m). Medium/largish accipiter; shortish rounded wing-tips, longish rounded tail, long thick legs/toes; isolated f may be specifically distinct. Faster lighter beats than 149; glides on flat wings, wrists forward; soars flat/slightly raised. Bird-eater; mainly still-hunts. [cf. 32/various accipiters and forest-falcons]



**148a Pale adult (male) (nominate; Yucatán to Peru/S Bolivia/Amazonia)** Slate-grey above, with black crown and browner wings; blackish tail with 2–3 grey bands; whitish-grey below with faint shaft-streaks, but crissum white, thighs rufous; eyes orange. Flight (148ax; ♀): white wing-linings mottled grey; light rufous remiges barréd; pale bands on dark tail (see bx).

**148b Dark adult (male) (nominate)** Blackish-grey above; thin tail-bands; dark grey below; obscure bars on crissum; thighs rufous as a. Flight below (148bx): wing-linings more mottled than ax, but much paler than body; white tail-bands; pale crissum clear.

**148c Intermediate adult (male) (nominate)** Colour tones between a and b.

**148d Adult (male) (pileatus; E/S Brazil/E Paraguay/NE Argentina)** Pale brownish-grey below, extending up as hind-collar. Flight (148dx): wing-linings as well as thighs rufous (cf. 32ax); 3 faint tail-bands. (Prey: Magpie Tanager *Cissopis leveriana*.)

**148e Adult (male) (guttifer; SE Bolivia/W Paraguay/NW Argentina)** Again variable below, from white-spotted pale grey (resembling d) to barréd/mottled white/grey; rufous (resembling rufous f); here white, mottled/barréd rufous; always plain rufous thighs.

**148f Adult (male) (chilensis; Andes of S Chile/S Argentina)** Darker above; below, mottled/barréd white, grey and more or less rufous.

**148g Pale juvenile (male) (nominate)** Blackish above, variably edged cream, with blacker crown, whitish collar; 3 grey tail-bands; below, plain white to buff (gx) but thighs mottled dusky. Flight below (148gx; ♀): linings plain as body; mottled thighs and clearly barréd remiges stand out; white bands on dark tail.

**148h Rufous juvenile (male) (nominate)** Rufous edges above; rufous below.

**148i Juvenile (male) (pileatus)** Paler than g above; wider edges, broader collar; below, white to rufous as g/h, but streaked blackish.



## PLATE 51: NEOTROPICAL ACCIPITERS II

### 133 Semicollared Hawk *Accipiter collaris*

L25–30 cm (11 in): S43–53 cm (19 in): T11–13 cm (5 in): ♂62%

Mountain forest, edges and clearings, 600–1,950 m. Small/smallish accipiter; little-known subtropical/temperate replacement of still smaller tropical 132 but for rounded shorter tail. [cf. 132/147]

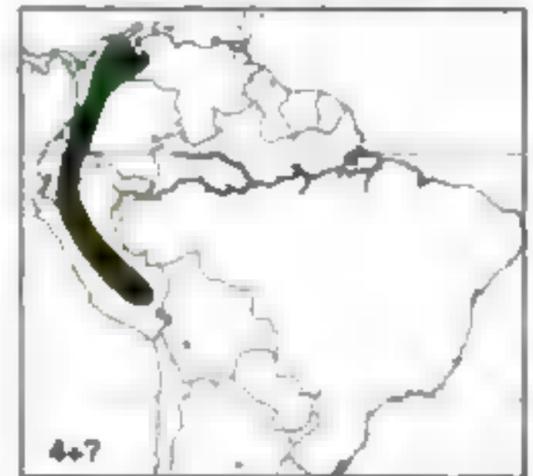
**133a Adult male** Sooty-brown above; blackish crown, mottled grey cheeks, obscure whitish collar; grey-banded tail; creamy below, all broadly barred brown except throat; eyes orange. Flight below (133ax): linings barred as body; remiges also well barred; pale bands on central tail, thin dark bars on paler sides.

**133b Adult female** In flight. Much as a but for size; coarser browner bars.

**133c Rufous juvenile (male)** Above, rufous with dusky mottling, or brown with broad rufous edges; blackish crown/nape, clear rufous collar; thin black bars on rufous tail; pale rufous below with diffuse bars, throat whitish. Flight below (133cx: ♀): all rufous, broadly barred on body, thinly on quills; linings plainer.

**133d Brown juvenile (male)** Brown above, at most thin rufous edges; darker crown, faint whitish/rufous collar; tail barred grey/black; creamy below, barred yellow-brown. (Rarer than c: cf. 132d/e.)

Text and map page 559



### 132 Tiny Hawk *Accipiter superciliosus*

L20–26 cm (9 in): S38–48 cm (17 in): T8–12 cm (4 in): ♂62%

Forest edge, open woodland, plantations, to 1,800 m. Tiny/small accipiter; pointed wing-tips, short squared or notched tail, long legs/toes. Notably preys on hummingbirds, by still-hunting or attending their regular perches. [cf. 133/147]

**132a Adult male** (nominate; S America E of Andes) Blackish above, crown darkest, mantle tinged grey; grey tail-bands; cheeks grey; white below, all thinly barred grey except throat; red eyes. Flight (132ax): as 133ax, but body/wing-linings thin-barréd.

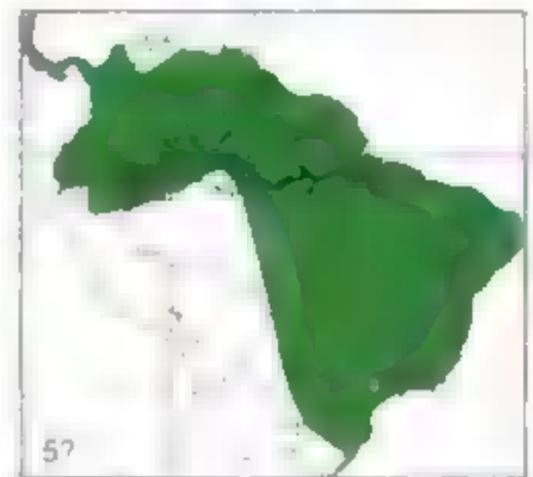
**132b Adult male** (*fontanieri*; Nicaragua/Ecuador) Smaller; darker; sharper bars below. (Prev Fork-tailed Woodnymph *Thalurania furcata*.)

**132c Adult female** In flight. Larger; browner bars; mantle also less grey.

**132d Brown juvenile (male)** Brown above; blackish crown/nape; tail barred grey/brown; cream below, barred brown or, as dx, rufous; eyes orange. Flight (132dx: ♀): all thinly barred, except linings.

**132e Rufous juvenile (male)** Rufous above, spotted/barréd dusky; blackish crown/nape; broader tail-bars than 132c; buff below, thinly barred dark rufous; eyes orange. (Rarer than d: cf. 133c/d.)

Text and map page 557



### 108 Grey-bellied Goshawk *Accipiter poliogaster*

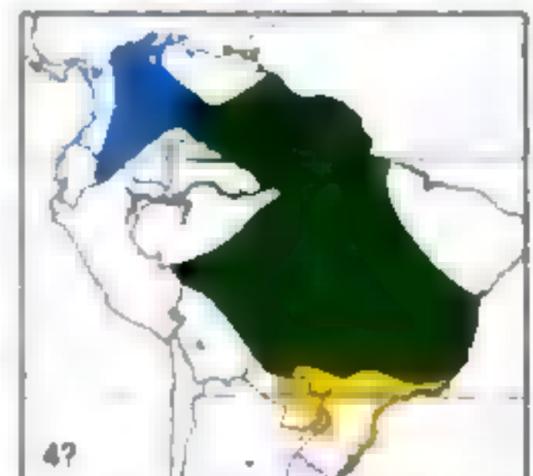
L38–46 cm (17 in): S69–84 cm (30 in): T17–21 cm (7 in): ♂71%

Lowland forest, dense woodland, riverine trees, to 500 m. Largish/large stocky accipiter; short rounded wing-tips/tail, heavy bill, short sturdy legs/toes. Shallow beats; glides on flat wings, wrists flexed. Mainly still-hunts. [cf. a264/148; b245a]

**108a Adult (male)** Black above, glossy when fresh (especially ♂), browner when worn (especially ♀); 2–3 grey tail-bars; cheeks vary from black (a) through dark grey (ax/ay) to pale grey (az); white to palest grey below; bare yellow brows. Flight below (108ax/ay: ♂/♀) all white to pale greyish; remiges darker-tipped and variably mottled; 2–3 bars, white below and grey above, on black tail.

**108b Juvenile (male)** Black-brown above, thinly edged white; paler bands on tail broader than on a; black moustaches, broad rufous cheeks/collar; white below, barred black; throat-streaks, rufous chest-sides, blotches. Flight below (108bx: ♀): boldly streaked/barréd black/rufous on white; barréd remiges tinged brown at tips; dark tail with whitish bands. (Long thought separate sp; resembles larger 245a, even to slight crest.)

Text and map page 516





133c

133a

133ax

132ax

133d

133b

132c

132a

133cx

132dx

132e

132b

108ax

132d

108ay

108b

108a

108az

108bx

DAVID MEAD

## PLATE 52: DISTINCTIVE AFROTROPICAL HAWKS

### 158 Long-tailed Hawk *Urotriorchis macrourus*

L56–65 cm (24 in): S81–94 cm (34 in): T31–37 cm (13 in): ♂84%

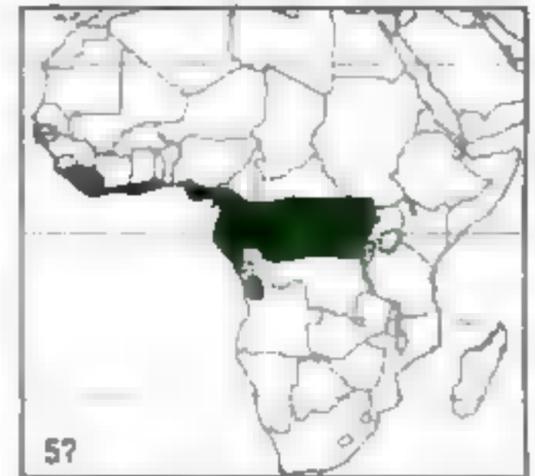
Lowland forest, to 900 m. Mid-sized accipitrine hawk; short rounded wings, very long graduated tail. Little known; mainly in canopy; mostly seen when flying across clearings or roads.

**158a Adult** Dark slate above; blackish tail with white U above base, white tips and 4 irregular bars; grey cheeks, paler throat; otherwise mostly chestnut below but for white crissum; eyes reddish-yellow. (Prev: Olive Thrush *Turdus olivaceus*.) Flight (**158ax**): chestnut linings as body; whitish remiges all boldly barred; white around base of white-spotted cuckoo-like tail.

**158b Dark adult** Dark grey replaces chestnut, so all slate except for white rump and crissum, white tail markings, and pale throat.

**158c Juvenile** Black-brown above (rump, too), edged tawny-rufous; rufous patches at chest-sides; white below, variably marked blackish (often spots on breast, bars on flanks/thighs), rarely almost plain (**158cx**); tail brown above, white below with black bands and whitish tips; eyes brown to yellow. Flight (**158cy**): white linings variably spotted; remiges less closely barred than a.

Text and map page 606



### 163 Lizard-buzzard *Kaupifalco monogrammicus*

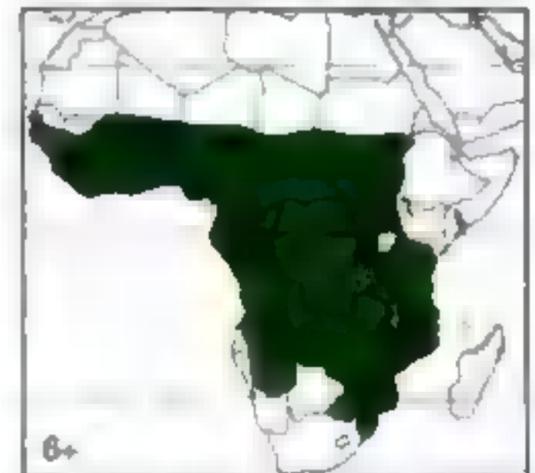
L30–37 cm (13 in): S63–78 cm (28 in): T13–16 cm (6 in): ♂76%

Broadleaved tall-grass woods, savannah, thornbush, cultivation, baobabs, locally to 3,000 m. Smallish thickset hawk, usually treated as buteonine but possibly closer to *Melierax*; rather pointed wings, medium tail, large head; wing-tips half down tail. Often upright on bare branch or pole; still-hunts; not shy. Flight low, direct, perch to perch, swooping up at end; rarely soars. Melodious chanting whistle. [cf. 104–107]

**163a Adult** Grey above with white rump and central band (sometimes 2) on blackish tail; grey head, chest, but white throat with black median stripe; white abdomen finely barred black, but crissum plain; eyes red-brown, eye-rings/cere/legs orange-red. Flight (**163ax**): white linings, barred body and remiges; white rump and tail-band. Hunts prev in long grass among trees (**163ay**).

**163b Juvenile** Pattern similar, but edged buff above, breast tinged brownish, crissum buff; eyes pale brown, cere/legs orange-yellow. Flight (**163bx**): less clear tail-band, mottled wing-linings.

Text and map page 613



### 159 Grasshopper Buzzard-hawk *Butastur rufipennis*

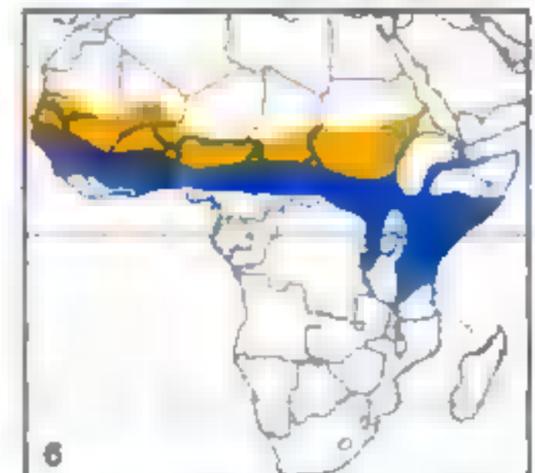
L39–44 cm (16 in): S92–106 cm (39 in): T16–18 cm (7 in): ♂86%

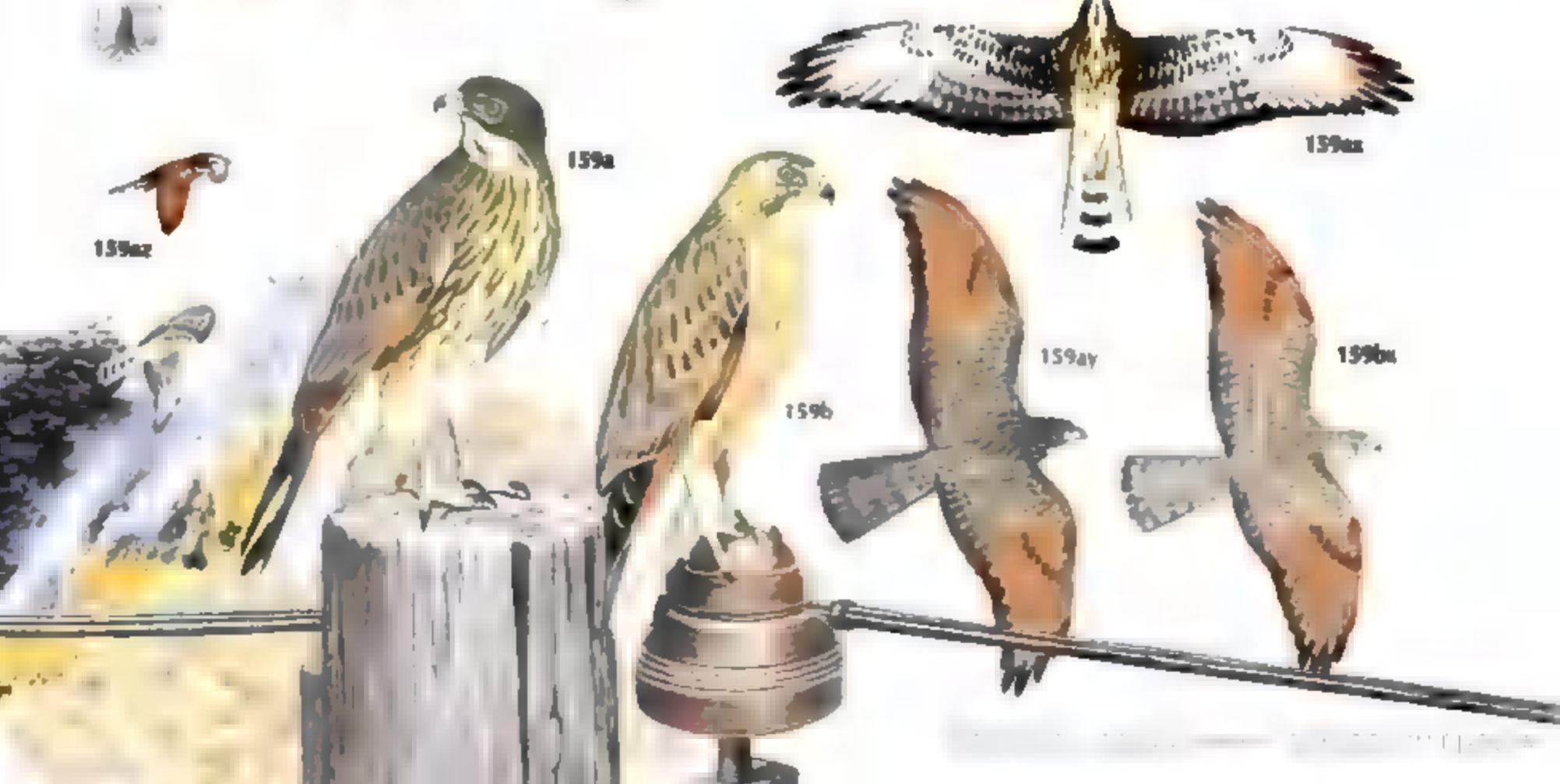
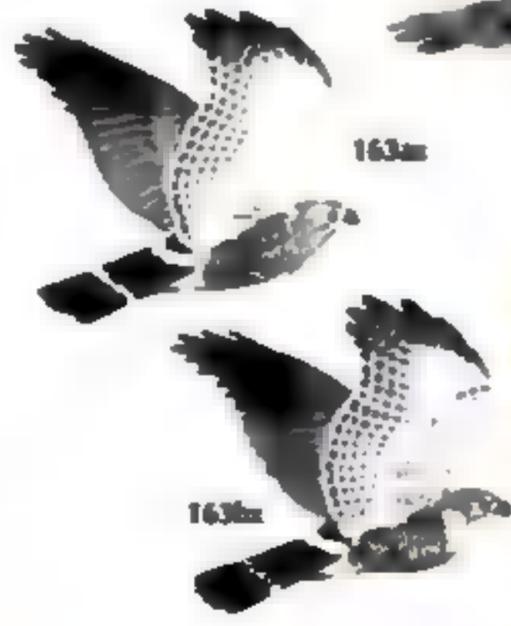
Savannah, thornbush, semi-desert, cultivation, forest edge, to 1,200+ m. Mid-sized, slender, kite-like, not a 'buzzard'; long wings rather pointed, medium tail, longish legs; wing-tips almost reach tail-tip. Regularly on same bare branch/pole; often not shy. Flight low, buoyant, rather harrier-like flaps/glides, swooping up to perch. Gregarious during short intra-tropical migrations, and when hunting insects at grass fires.

**159a Adult** Grey-brown above, dark-streaked; mantle/shoulders edged rufous; bright reddish panel on outer wings, black-tipped primaries; obscurely barred tail; buff-white throat, dark median streak, slight moustaches; variably rufous below, streaked black on breast. Flight below (**159ax**): rufous body, whitish linings also streaked, pale rufous primary-patches, banded grey tail. Above (**159ay, z**): dark head, clear reddish wing-patches.

**159b Juvenile** Head light rufous, dark-streaked; broader rufous edges than a; remiges white-tipped; central tail plain, sides often barred. Flight above (**159bx**): Pale head; wing-patches as a.

Text and map page 608





## PLATE 53: EAST PALEARCTIC AND INDOMALAYAN BUZZARD-HAWKS

### 160 Rufous-winged Buzzard-hawk *Butastur liventer*

L35–41 cm (15 in): S84–91 cm (34 in): T14–15 cm (6 in): ♂90%

Open woodland, savannah, ricefields, to 1,500 m. Not a 'buzzard'; smallish, slender, more like harrier or kite with long narrow wings, squared tail, weak bill; wing-tips cover tail. Glides and soars on flattish wings; beats fast, accipiter-like, or slow and deep. Regular perches, often low; not shy; still-hunts. Solitary. [cf. 161/162; buteos]

**160a Adult** Grey-brown above, darkest on finely streaked head/mantle, paler on rufous-tinged back-coverts; dark rufous tail with subterminal band, 2–3 broken bars; reddish remiges similarly marked; plain whitish throat; dark-shafted brown-grey breast, obscurely barred belly, white crissum. Flight below (**160ax**): grey body, whitish wings; rufous-grey quills faintly barred. Above (**160ay**): reddish quills, black trailing band.

**160b Juvenile** Much as **a**, but darker brown above; more heavily streaked head tinged rufous, with whitish forehead, supercilia; browner wing-coverts edged creamy; more tail-bars; and whiter throat. Flight above (**160bx**): again as **ay**, but browner head/forewings.

Text and map page 609



### 161 White-eyed Buzzard-hawk *Butastur teesa*

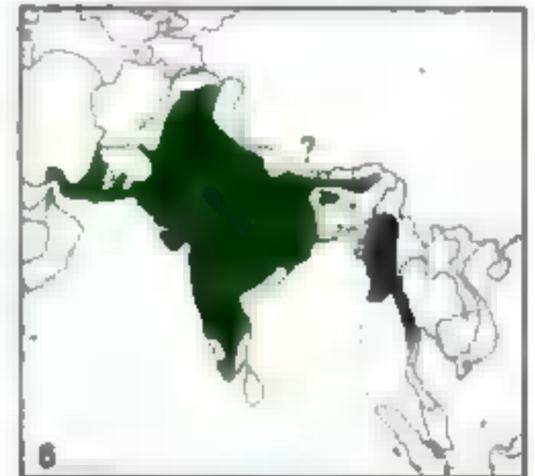
L38–43 cm (16 in): S88–100 cm (37 in): T15–18 cm (6 in): ♂84%

Open woodland, scrub, cultivation, to 1,200 m. Smallish, slim; shape, flight and behaviour much as 160; perhaps more often on ground, still-hunting from perch on mound or stone, or walking after insects. Sluggish. [cf. 160/162; buteos]

**161a Adult** Dark-streaked rusty-brown above; shoulders mottled white; sub-terminal band on rufous tail, other thin bars often faint or absent; white on nape, forehead/lores; white throat, black moustaches/median stripe; black shafts on brown cheeks; chest, lower breast barred brown/buff, thighs, vent all buff; rufous; eyes yellow-white. Flight below (**161ax**): throat-stripe; wings paler than body, esp near tips, despite barred inner linings and secondaries; greyish tail faintly barred centrally, plain sides. Above (**161ay**): wing-coverts/nape-patch paler; rufous tail variably marked.

**161b Juvenile** Brown above, edged paler; head much paler, with white forehead/supercilia; quills as **a** but tail more barred; cream below, dark-streaked except on throat/thighs/crissum. Flight (**161bx**): head/wing-coverts usually paler than **a** or **160b/162b**.

Text and map page 610



### 162 Grey-faced Buzzard-hawk *Butastur indicus*

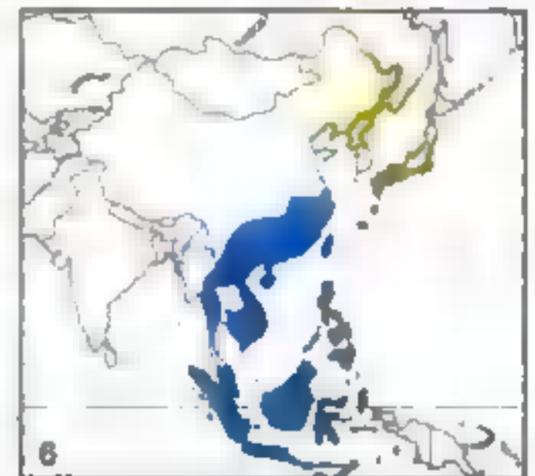
L41–48 cm (18 in): S101–110 cm (42 in): T18–20 cm (7 in): ♂95%

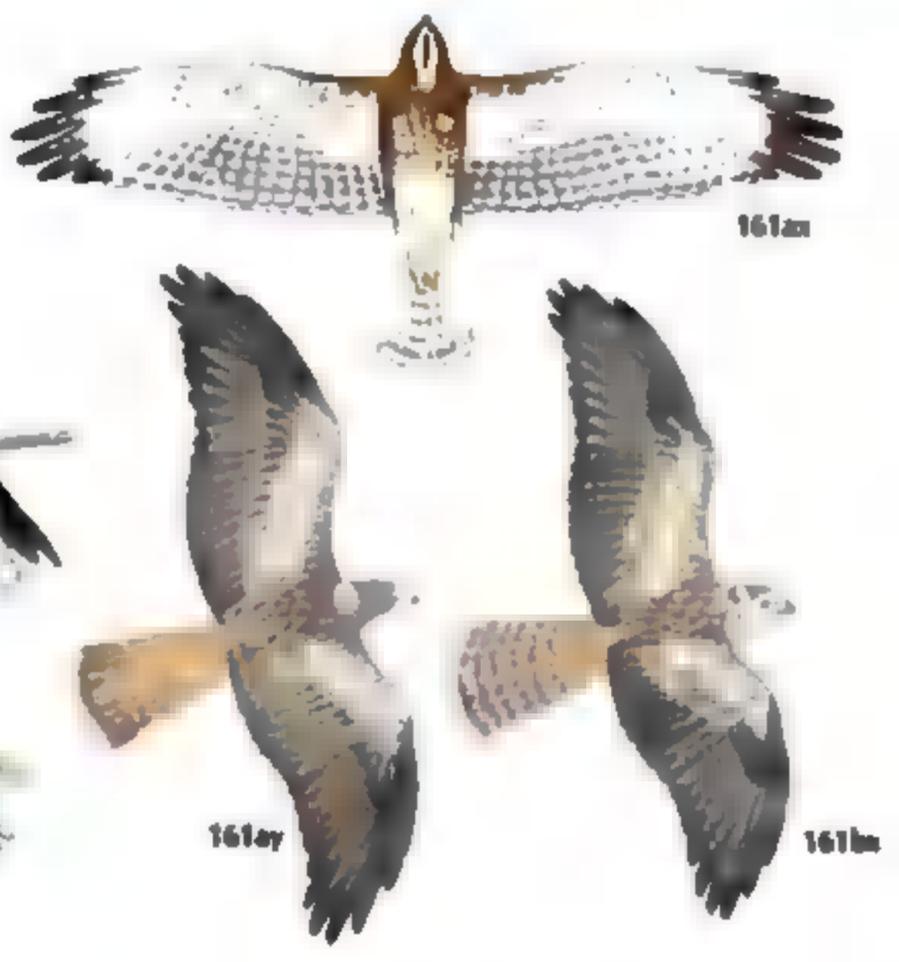
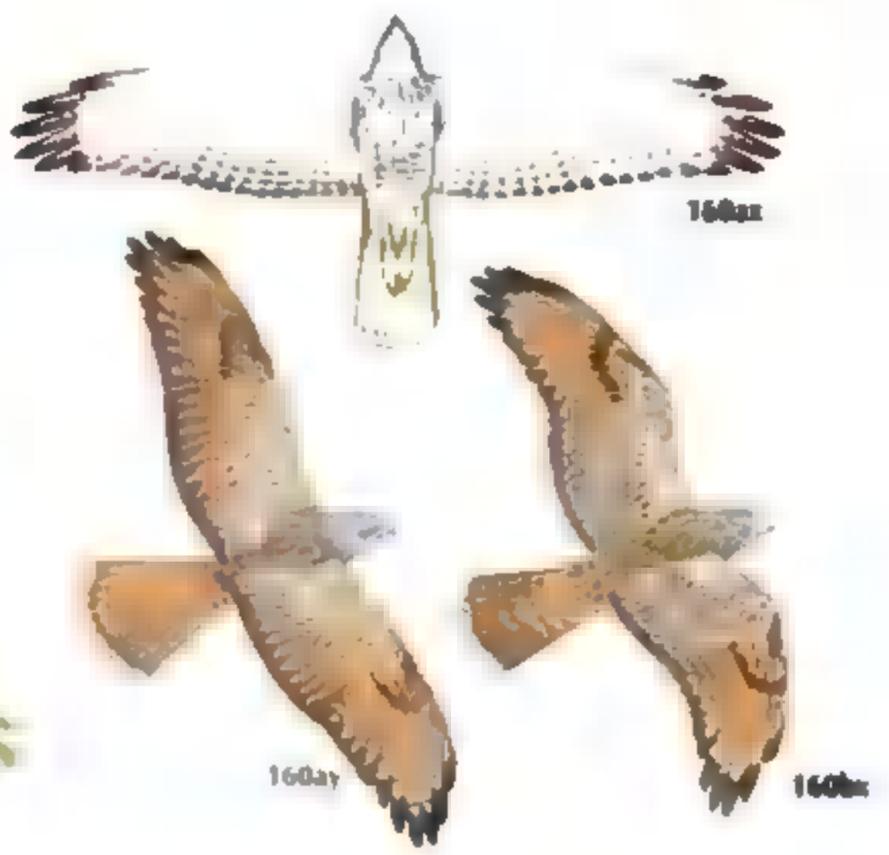
Breeds more wooded/mountainous areas than 160/161, to 2,000 m; winters ricefields, plains with trees. Mid-sized slender raptor, larger than congeners; shape, flight and behaviour much as 160; less sluggish. Flocks on migration. [cf. 160/161; buteos]

**162a Adult** Dark-streaked grey-brown head; faint white nape-patch; back dark-streaked brown, greater coverts variably edged white, rump mottled white; 3 dark bands on brown-grey tail; white throat, dark grey moustaches/median stripe; rufous to dark brown chest streaked black; breast/abdomen/thighs barred white and brown, crissum white. Flight below (**162ax**): throat-stripe; white linings barred brown; white to rufous-grey remiges thinly barred grey; dark central bands on grey tail. Above (**162ay**): some white on nape/rump; black wing-tips/trailing edges; white U above tail, 3 tail-bands.

**162b Juvenile** Streaky brown head edged rufous; whitish forehead, strong whitish supercilia above bold dark ear-coverts; black-streaked dark brown above, edged buff/white (esp on wing-coverts); white to pale rufous below with throat-stripe, broad red-brown streaks, barring only on flanks/thighs. Flight above (**162bx**): paler collar, wing-coverts and rump; 4–5 tail-bands.

Text and map page 612





## PLATE 54: NEOTROPICAL HAWKS I

### 164 Crane-hawk *Geranospiza caerulescens*

L38–54 cm (18 in): S76–111 cm (37 in): T20–25 cm (9 in): ♂77%

Swampy forest, woods/scrub near water, to 750+ m. Slim and lanky; rounded wings, broad secondaries, long tail. Like 89, probes with small head and long double-jointed legs, balancing on spread wings. [cf. 165/176–178/199]

**164a Adult** (nominate; N Colombia/Guianas/Amazonia) Grey; 2 white tail-bands and tip; belly/thighs barred white or buff (ax); eyes/feet red-orange, cere grey. Flight (164ax): white wing-arc obvious below (cf. b); 2 tail-bands; bars on linings/abdomen variable.

**164b Adult** (*gracilis*; NE Brazil) All clearly barred white below, or throat/chest may be plain grey; wider tail-bands tinged buff.

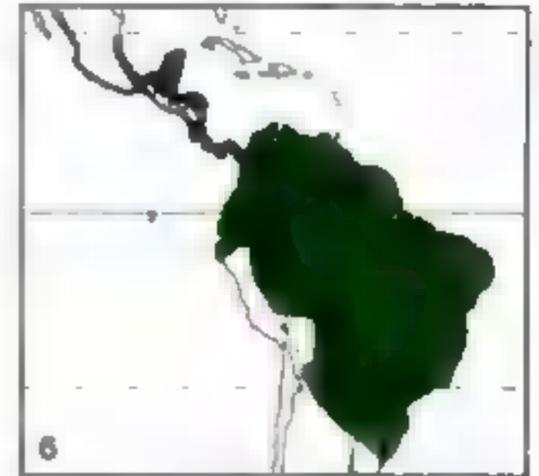
**164c Adult** (*flexipes*; Bolivia/S Brazil/N Argentina/Uruguay) Largest/palest race; bars variably also on face/wings/mantle; crissum/tail-bands buff.

**164d Adult** (*nigra*; Mexico to W Panama) Darkest race, slate-black; often pale barring on abdomen/wing-linings.

**164e Juvenile** (nominate) Grey above, edged/washed buff, tail as a but hands tinged buff; streaked grey and white below, belly/vent/thighs more barred and buff-tinged; cere black, legs orange-yellow.

**164f Juvenile** (*nigra*) Darker; heavier barring below; tail-bands whiter.

Text and map page 615



### 165 Slate-coloured Hawk *Leucopternis schistacea*

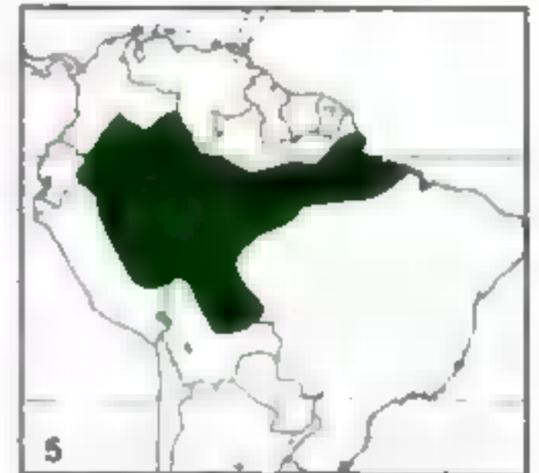
L41–46 cm (17 in): S85–96 cm (36 in): T18–20 cm (7 in): ♂89%

Forest rivers/streams/lagoons, to 500+ m. Smallish buteonine; rounded wings/tail, short legs; wings cover only tail-base. Still-hunts frogs/snakes from open streamside perch or bank. Piercing downslurred whistle. Most *Leucopternis* are pied or white (plates 55–56); facing 3 are dark. [cf. 15e/30b/164/177]

**165a Adult (male)** Mainly blue-slate; blackish head/wing-tips/tail, last with thin white tip, bold central band; cere/feet red-orange. Flight (165ax: ♀, 165ay: ♂): all dark but for white on tail.

**165b Juvenile (female)** Much as a; sometimes second tail-band; abdomen and thighs faintly barred white; cere/feet orange. Flight below (165bx: ♂): dark-banded white wings far paler than body/tail.

Text and map page 617



### 166 Plumbeous Hawk *Leucopternis plumbea*

L33–37 cm (14 in): S71–79 cm (30 in): T13–15 cm (6 in): ♂83%

Humid forest, to 800 m (1,400 m). Like 165, but smaller, stockier, much shorter-tailed; wing-tips one-third down tail. Rare; perches openly in early mornings, otherwise rather low inside forest. [cf. 15e/30b/33/164/177]

**166a Adult (male)** Dark slate with blackish wings/tail; white tail-band (but not tip) as 165, obscure white barring on thighs; eyes orange-red, cere/feet orange. Flight below (166ax: ♀): white wings contrast dark tips/rear edges/body/tail; tail-band, barred thighs. Above (166ay: ♂): all dark but for tail-band.

**166b Juvenile (large female)** Much as a; thighs more barred, lower abdomen mottled greyish; sometimes 2nd tail-band; some barring on underwings.

Text and map page 618



### 167 Barred Hawk *Leucopternis princeps*

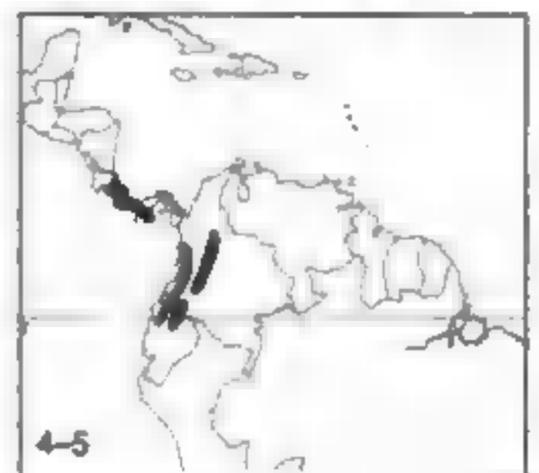
L51–57 cm (21 in): S112–124 cm (46 in): T20–23 cm (8 in): ♂91%

Wet/mountain-cloud forest, 500–2,500 m (50–3,000+ m). Largish buteonine; fairly long broad wings, short tail; wing-tips half down tail. Unlike congeners, often soars. Then noisy; screaming *kee-aaarr, weep...weep...* in series. [cf. 185]

**167a Adult (male)** Blue-black, edged slate on head/chest, blotched white on scapulars; white tail-band; white abdomen barred black; eyes blue, snout-like yellow bill. Flight below (167ax: ♀): all white, finely dark-banded (looking greyish), but for black head/wing-tips/tail-band; tail-base white with grey bars. Above (167ay: ♂): dark but for tail-band, blotched scapulars.

**167b Juvenile (female)** As a but thin whitish edges on back/wing-coverts.

Text and map page 619





164a

164d

164b

164e

164f

164c

164g

165a

165m

165n

165b

165o

166y

166n

166a

166b

167a

167b

167y

167n

## PLATE 55: NEOTROPICAL HAWKS II

### 168 Black-faced Hawk *Leucopternis melanops*

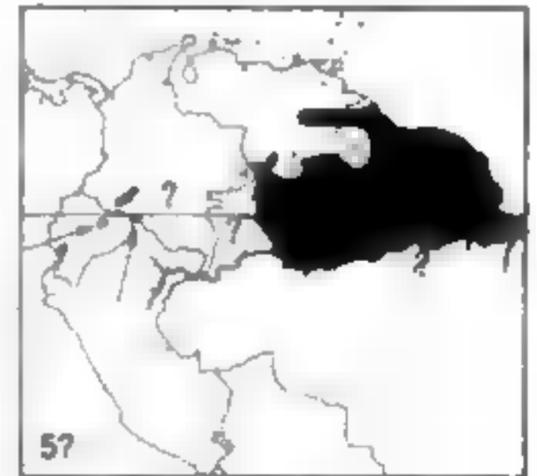
L35–43 cm (15 in): S65–78 cm (28 in): T13–15 cm (6 in): ♂83%

Wet lowland forest, secondary growth, mangroves, thickets by rivers, to 1,000+ m. Small buteonine; short rounded wings, medium tail. Fast shallow beats and short glides; rarely, if ever, soars. Not shy, but perches in open only early in day; still-hunts reptiles. Long, clear, thin whistle. [cf. 169/171/172]

**168a Adult** Black mask/streaks on white head; white spots on black scapulars; white central band on black tail; all white below; cere orange. Flight below (168ax): mainly white; barred ends of remiges; white band on black tail. Above (168ay): mainly black; streaky white head/mantle, spotted back, tail-band.

**168b Juvenile** As a, but cream-tinged head, thinner streaks; back/wings faintly edged buff; at least partial (as here) 2nd tail-band.

Text and map page 620



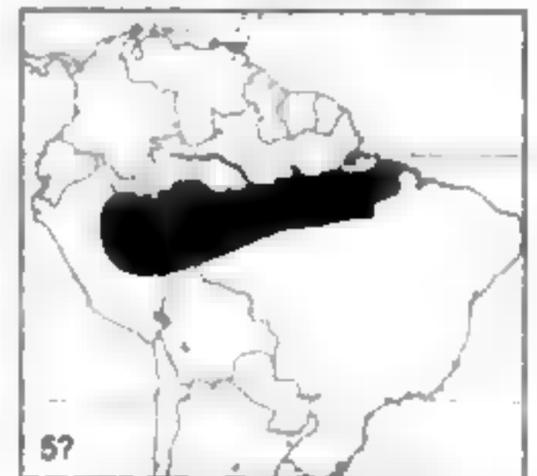
### 169 White-browed Hawk *Leucopternis kuhli*

L32–40 cm (14 in): S65–76 cm (28 in): T13–16 cm (6 in): ♂80%

Wet forest, to 500 m. Small buteonine; size/shape much as 168, and not dissimilar in pattern, but largely allopatric. Little known; still-hunts amphibians/reptiles. [cf. 168/172]

**169a Adult** Mainly black above, speckled white from crown to upper mantle; thin white supercilia above black mask; white central tail-band; white below, streaked black on lower cheeks and chest-sides; cere orange. (Prey: green tree-frog *Hyla*.) Flight below (169ax): mainly white with barred ends to remiges, white-banded black tail, like 168 but for streaked chest-sides, paler tail-base (largely hidden by coverts). Above (169ay): darker head, plainer back. [juvenile similar but said to have 2–3 thin white bars on tail.]

Text and map page 621



### 170 White-necked Hawk *Leucopternis lacernulata*

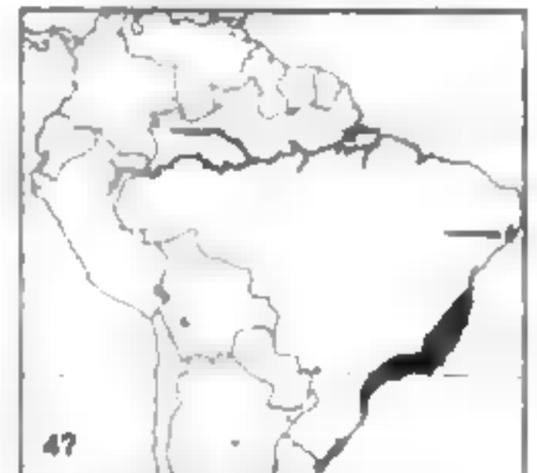
L42–48 cm (18 in): S91–101 cm (38 in): T16–19 cm (7 in): ♂89%

Forest, plantations, to 900 m (2,800+ m). Mid-sized buteonine; like big 168, but longer wings over half down tail. Insect-eater. [cf. 174]

**170a Adult** Head/underparts white, tinged grey on nape/upper mantle; dark slate above, marked white on lower back/rump/lateral tail-coverts; basal tail dark slate with some white barring, distal white with black subterminal band. Flight below (170ax): largely white but for black-tipped primaries, grey-barréd secondaries with broad trailing edges, dark basal barring and subterminal band on tail. Above (170ay): all-dark wings; white head and distal tail with black band; spots on back and bars on sides of tail-base.

**170b Juvenile** Black above; coverts edged white; streaked crown/mantle.

Text and map page 622



### 171 Semiplumbeous Hawk *Leucopternis semiplumbea*

L31–36 cm (13 in): S51–64 cm (23 in): T13–15 cm (6 in): ♂75%

Wet forest, to 1,000 m. Small chunky buteonine; short rounded wings just exceed tail-base. Fast beats, short glides; rarely, if ever, soars. Still-hunts under cover. Long high whistle, or in series. Attracted to birds following legionary ants (here Spotted Antbird *Hylophylax naevoides*). [cf. 191/264]

**171a Adult** Hooded; slaty above, wings/tail darkest; white tail-band; all white below; cere/feet orange-red. Flight below (171ax): linings white, greyer remiges barred blackish; white band on black tail. Above (171ay): all dark but for white tail-band.

**171b Juvenile** Head streaked and mantle mottled white; some brown edges above; thin black streaks below (especially on chest); 2 tail-bands.

Text and map page 623



168a

168ay

168ax

168b

168ax

169a

169ay

170ay

170a

170b

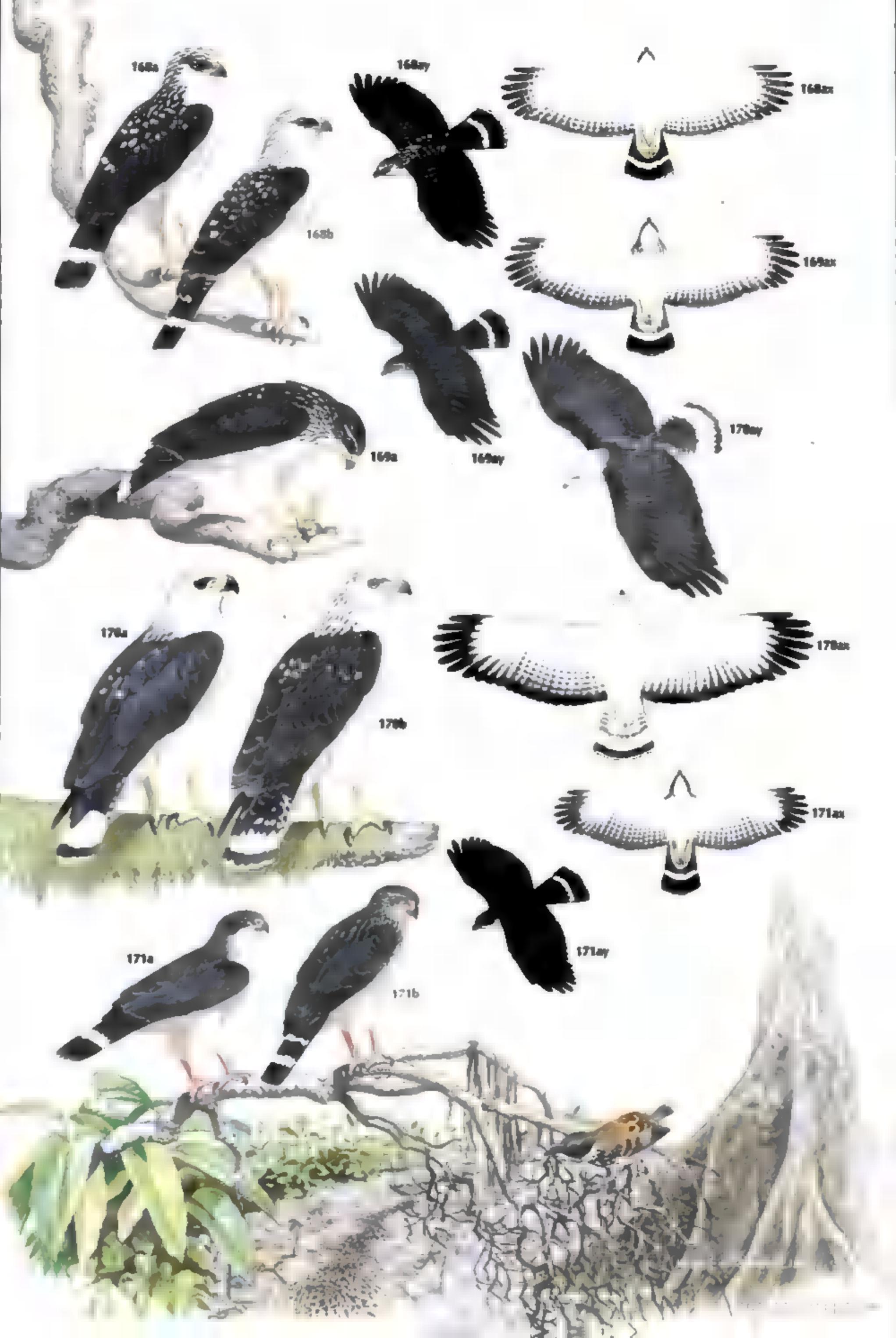
170ax

171ax

171a

171b

171ay



## PLATE 56: NEOTROPICAL HAWKS III

### 172 White Hawk *Leucopternis albicollis*

146–58 cm (20 in): S98–117 cm (42 in): T19–25 cm (9 in): ♂79%

Forest edge, swampy clearings, to 1,500 m. Largish buteonine; broad rounded wings, shortish tail; wing-tips half down tail. Slow strong beats; glides on flat wings; unlike most 'white hawks', often soars. Long wheezy call, *shreer*. Still-hunts snakes/lizards from forest-edge perch; not shy. [cf. **abd** 168/169]

**172a Adult** (nominate; S America except NW) White head/underparts, or slight streaks on crown; black lores; spotted mantle; black wings edged white; black tail with white base/broad tip; cere grey. Flight below (**172ax**): white except tail-band, wing-tips and subterminal band on barred secondaries. Above (**172ay**): white head/mid-back/rump; and white-edged black wings/tail.

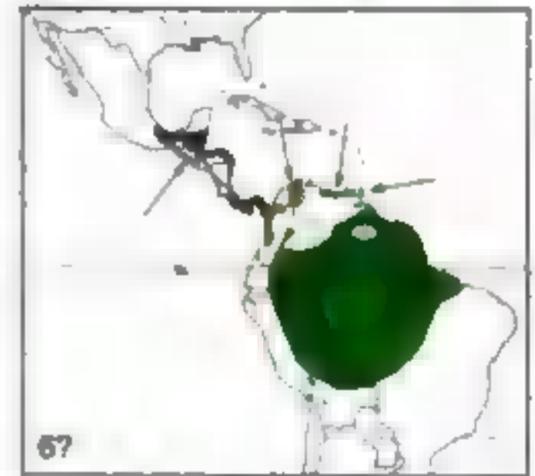
**172b Adult** (*williaminae*, NW Colombia/W Venezuela) White above extends to black-barréd scapulars, but crown clearly shaft-streaked, broken half-collar; whiter tail with broad black subterminal band. (Prey: common iguana *Iguana iguana*.) Flight above (**172bx**): extensive white, more or less marked black, on head/back/scapulars; white tail, black band.

**172c Adult** (*ghiesbreghtii*, S Mexico/Nicaragua) All white except black lores, wing-tips, alula, and thin or even broken tail-band. Flight (**172cx**–**y**): white with black wing-tips and tail-band.

**172d Juvenile** (nominate) Much as **a**, but whole head and underparts more or less tinged buff; thin black streaks on crown and nape.

**172e Juvenile** (*ghiesbreghtii*) Still very white (cf. **c**), but much black on remiges, spots on wing-coverts, shaft-streaks on crown/back.

Text and map page 624



### 173 Grey-backed Hawk *Leucopternis occidentalis*

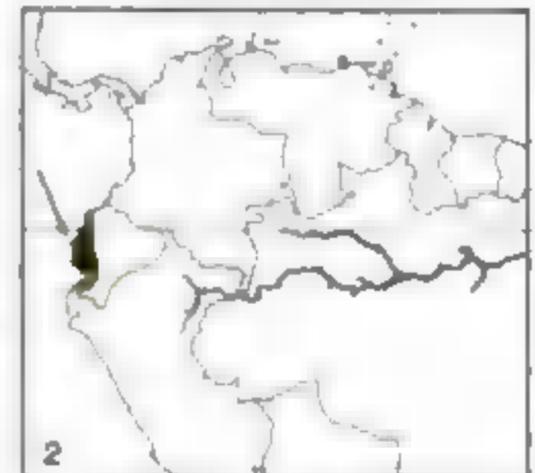
145–52 cm (19 in): S104–116 cm (43 in): T20–22 cm (8 in): ♂85%

Forest, to 1,400 m (2,900 m). Largish buteonine; shape much as **172** (with which it and **174** form superspecies), though shorter-tailed. Flight/actions perhaps similar; rare, little known. [cf. **172**]

**173a Adult** Blackish-grey above, streaked white on head/mantle, tipped white on blacker wings; wide black subterminal on white tail; white below, often few dark chest-streaks; cere grey. Flight below (**173ax**): white with black wing-tips/tail-band as **172ax**, but thinner subterminal on barred secondaries. Above (**173ay**): blackish-grey, including upper back (cf. **172ay**), with streaked head, mainly white rump/tail; white trailing edge to wings.

**173b Juvenile** Very much as **a**, but paler above, more dark grey than blackish; spotted grey on chest, faintly barred on flanks.

Text and map page 626



### 174 Mantled Hawk *Leucopternis polionota*

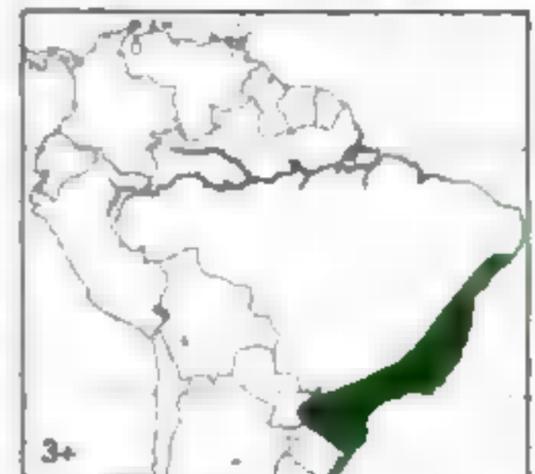
151–56 cm (21 in): S118–129 cm (49 in): T18–23 cm (8 in): ♂79%

Forest, to 1,500+ m. Largish buteonine; forms superspecies with **172/173**, but larger than **172a**, and relatively longer-winged, shorter-tailed. Actions again perhaps similar; rare. [cf. **170**]

**174a Adult** Head/upper mantle white but for few faint shaft-streaks; slaty-black above, tipped white on back, rump, tail-coverts, scapulars and secondaries; basal half of tail black, distal white; below, white; cere yellowish or grey [?]. Flight below (**174ax**): white with black wing-tips and barred secondaries, but no obvious dark trailing edges and largely white tail (greyish base almost hidden by white coverts). Above (**174ay**): slaty-black with white head and tail-end; white back markings and thin trailing edge to wings.

**174b Juvenile** Very like **a**, but more extensive and blacker streaks on head, darker back, more white edges also on wing-coverts.

Text and map page 627





172a

172d

172cy

172c

172e

172m

172ay

172cy

172bx

172ky

172b

172a

173a

173b

173ay

174b

174a

174ay

174ay

## PLATE 57: NEOTROPICAL BLACK HAWKS

### 177 Common Black Hawk *Buteogallus anthracinus*

L50–56 cm (21 in): S106–128 cm (46 in): T19–24 cm (8 in): ♂87%

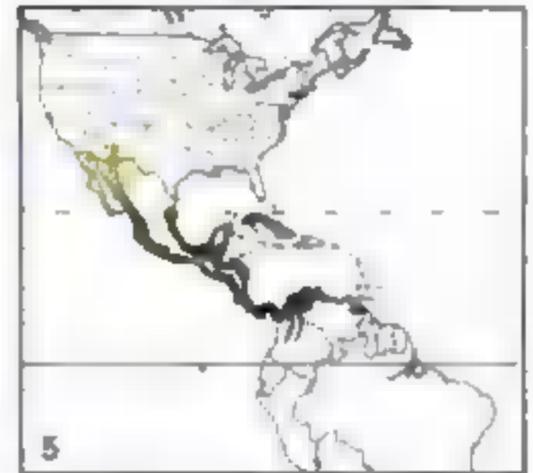
Forest wetland, coasts, rivers, to 1,800 m; mangroves, too. Broad wings, short tail, longish legs. Slow strong beats; soars/glides on flat wings. High whistle. [cf. 176/178/15c/164–166/183/199/dark-morph buteos]

**177a Adult** (nominate; all but Cuba) Black; white tail-band/thin tip; lores/feet orange-yellow. Flight below (**177ax**): tail-band; whitish at base of outer primaries. Above (**177ay**): tail-band.

**177b Adult** (*gundlachii*, Cuba) Smallish; browner-black, edged paler; whitish moustaches; larger patch at base of primaries below.

**177c Juvenile** (nominate) Blackish-brown above, edged rufous and white; crown streaked buff; buff supercilia/cheeks/throat, dark eye-stripes/moustaches; 4–7 wavy dark bars on pale tail (cf. **178c**), subterminal widest; buff below, blotched black (especially flanks), thighs/crissum barred. Flight below (**177cx**): buff linings streaked; dark carpal arcs, buff windows, tawny secondaries.

Text and map page 631



### 176 Mangrove Black Hawk *Buteogallus subtilis*

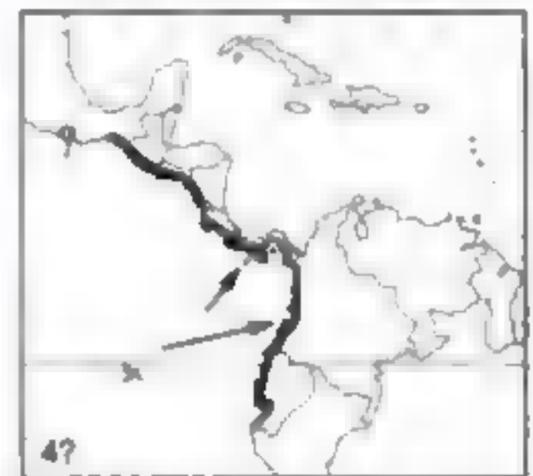
L45–49 cm (19 in): S96–106 cm (40 in): T16–19 cm (7 in): ♂92%

Mangroves, mudflats, marshes. Often treated as race of 177, but quite sharply defined ecologically, slightly smaller, relatively short-winged. [cf. 177]

**176a Adult** On ground much as small 177, but generally in mangroves, where feeds almost exclusively on crabs caught by walking on mud and even wading in. Flight below (**176ax**): mainly black with white tail-band/tip, like **177ax**, but redder secondaries, larger whitish/pale rufous patch at base of outer primaries.

**176b Pale Juvenile** Dull grey-buff finely streaked brownish on head, more blotched on back/breast, barred on flanks/tail/retrixes. [Pale immature mostly plain grey-buff; normal juvenile much as **177c**.]

Text and map page 629



### 175 Rufous Crab-hawk *Buteogallus aequinoctialis*

L42–47 cm (18 in): S90–106 cm (39 in): T15–17 cm (6 in): ♂94%

Coastal swamps, mangroves. Specialist crab-eater as 176, but smaller, shorter-winged, more plumage divergence. [cf. 179/181/b178c]

**175a Adult** Black head/throat; black above, edged rufous; secondaries rufous; obscure whitish tail-band, clearer tip; rufous below, finely barred blackish; legs orange. Flight below (**175ax**): black-barred rufous; black wing-ends, thin white tail-bar. Above (**175ay**): blackish with black-tipped rufous secondaries.

**175b Juvenile** Blackish above, edged rufous/buff; secondaries tawny; greyish tail finely barred; pale supercilia; cream below, streaked blackish (esp. chest), thighs barred. Flight below (**175bx**): pale patch on primaries; more rufous secondaries; dark-ended tail.

Text and map page 623



### 178 Great Black Hawk *Buteogallus urubitinga*

L55–67 cm (24 in): S113–136 cm (49 in): T23–27 cm (10 in): ♂92%

Forest swamps, riverine trees, wooded savannah, foothills, to 1,900 m. Less water-based than 177; larger, longer-legged, and shorter-winged. Harsh scream. Hunts also in flight. [cf. 177/183]

**178a Adult** (nominate; S America) Black; white rump/tail-base/tip; lores yellow. Flight above (**178ax**): whiter rump than **177ay**.

**178b Adult** (*ridgwayi*, C America) Flight below. Central tail-band as **177a**, usually 2nd thin bar at base; linings/thighs spotted white; lores slaty. Both races: less (if any) whitish on primaries.

**178c Juvenile** (nominate) Like big **177c**, but cheeks/throat less streaked, no moustaches; tail browner, coverts paler. Flight below (**178cx**): relatively short-winged; far more tail-bars (10–14).

Text and map page 632





## PLATE 58: SOLITARY-EAGLES AND EAGLE-BUZZARD

### 183 Black Solitary-eagle *Harpyhaliaetus solitarius*

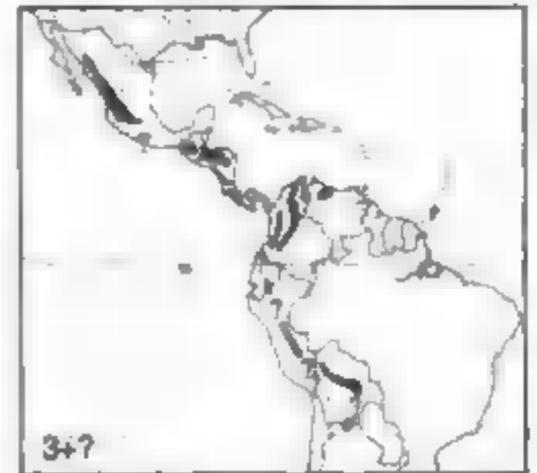
L65–75 cm (28 in): S157–180 cm (66 in): T22–28 cm (10 in): ♂85%

Lower mountain forest, to 2,500 m. Large buteonine like big 178: wings relatively longer/wider, very short tail; slight crest, longish bare legs; wing-tips reach tail-tip. [cf. 178/177/b184b]

**183a Adult** All dark slate-grey (♀ slightly browner) but for broad white tail-band and thin white tips to tail and uppertail-coverts. Flight below (**183ax**): and above (**183ay**) all slaty except for tail-band; not so black as 178.

**183b Juvenile** Dark brown above, barely edged rufous; tail pale-mottled (variably rump, too), with blackish subterminal band; streaked sandy-buff head with buff supercilia, blackish eye-stripes; sandy-buff below, heavily dark-streaked, with nearly solid black patches (sometimes finely barred rufous) on chest-sides and thighs; blackish crissum tipped rufous; legs greenish. Flight below (**183bx**): black patches on chest-sides/thighs; pale buff linings more lightly marked than body; black-tipped primaries whitish at base; darker secondaries grey-brown.

Text and map page 642



### 184 Crowned Solitary-eagle *Harpyhaliaetus coronatus*

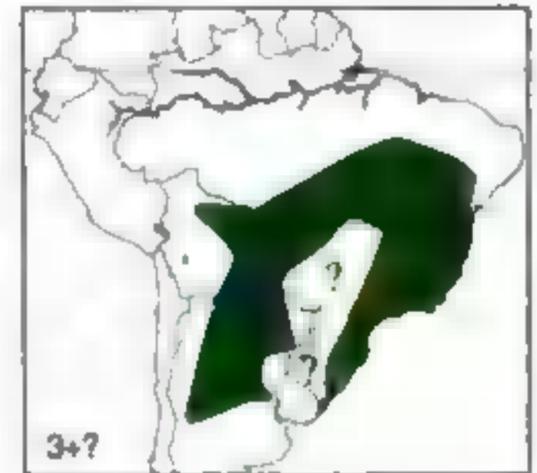
L73–79 cm (29 in): S170–183 cm (69 in): T26–32 cm (11 in): ♂80%?

Open woodland, savannah, to 1,200 m. Large buteonine; narrower wings than 183 and longer tail, clear crest; wing-tips short of tail-tip. Perches low; tame. Crepuscular. [cf. 178; b188b]

**184a Adult** Mainly brownish-grey, darkest on crest and back, greyest on wing-coverts; broad white tail-band/thin tip. Flight below (**184ax**): linings grey, edged/streaked whitish; blackish thighs; black tips and trailing edges to wings; white tail-band. Above (**184ay**): dark grey-brown; white-tipped rump; white tail-band. Dusk swoop on Amazonian hog-nosed skunk *Conepatus semistriatus* (**184az**).

**184b Juvenile** Paler than 183b; greyer-brown above, coverts edged buff; paler tail with clearer subterminal band; whitish below, less streaked, but spots still tend to coalesce at chest-sides, and thighs dark-banded; crest as long as a. Flight below (**184bx**): much as 183b but paler, less heavily marked, with less clear dark patches on chest/thighs; sharper tail-band.

Text and map page 644



### 182 Black-chested Eagle-buzzard *Geranoaetus melanoleucus*

L60–76 cm (27 in): S149–184 cm (66 in): T20–26 cm (9 in): ♂67%

Thin woodland, grassland, dunes, open hills, mountains, to 4,500 m. Large bulky buteonine; long wings very broad; stubby tail wedged/rounded; wing-tips exceed tail-tip. Slow beats; glides/soars on flat wings, often in pairs. [c183b/184b/247bc]

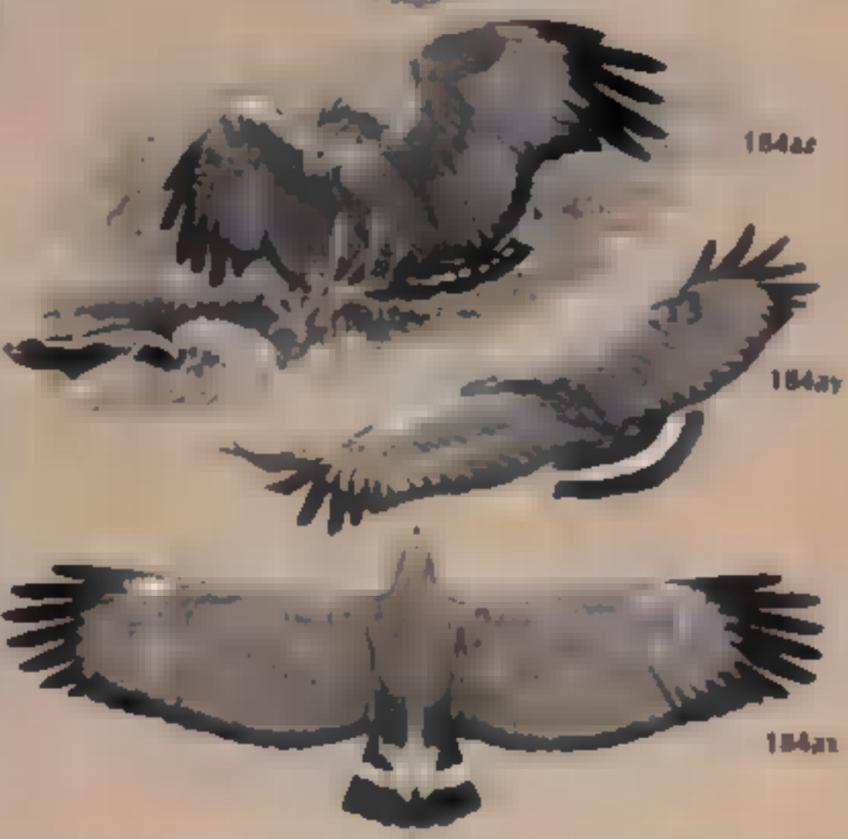
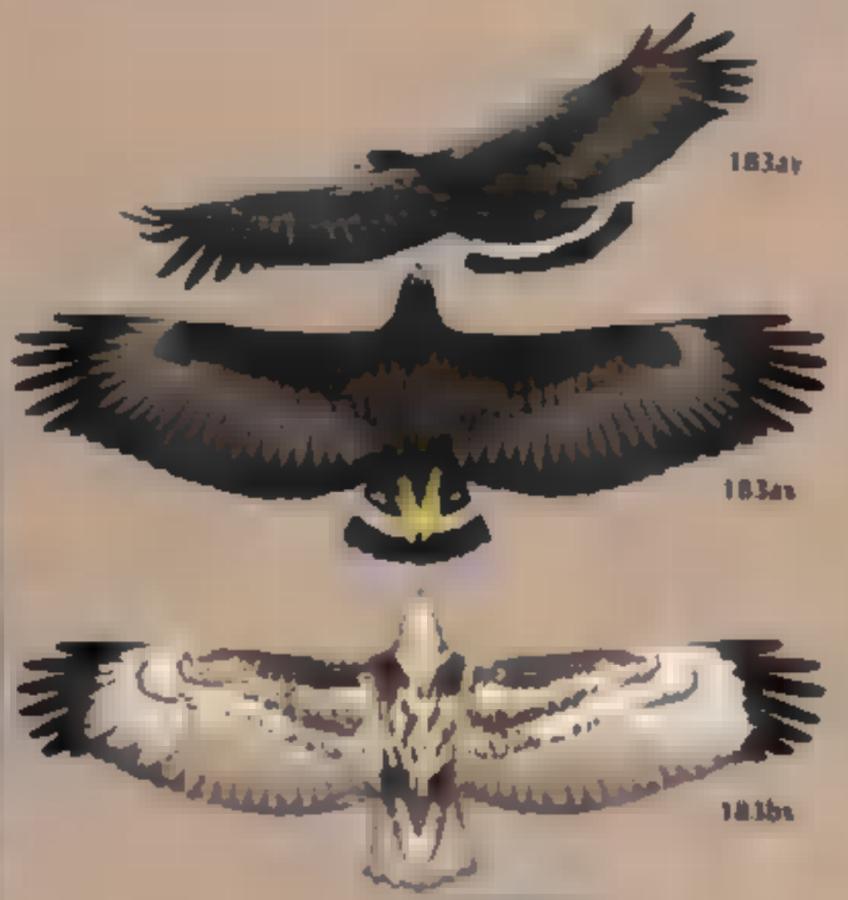
**182a Adult** (nominate; E Bolivia/S Brazil/E Argentina/Uruguay) Dark slate-grey above; shoulders pale grey with fine dark bars/black shafts; tail thinly tipped white; cheeks/throat grey; chest slate-grey with tiny white tips; below, plain white or a few fine bars.

**182b Adult** (*australis*; rest of range) White abdomen all grey-banded. Flight below (**182bx**): fine-banded white body/linings; dark chest/quills. Above (**182by**): shoulders much paler than rest.

**182c Juvenile** Dark brown above, edged rufous-buff on back, scapulars and shoulders; streaked crown/nape, pale supercilia; longer tail grey-brown, mottled/banded blackish; buff/rufous below, throat thinly streaked dark brown, breast almost plain or with scattered heavier streaks, belly/thighs heavily banded. Flight below (**182cx**): linings well marked, so throat/breast look paler; also pale bases to primaries.

Text and map page 640





## PLATE 59: NEOTROPICAL HAWKS IV

### 179 Savannah Hawk *Buteogallus meridionalis*

L46–64 cm (22 in): S121–140 cm (51 in): T19–23 cm (8 in): ♂86%

Savannah with marshland, to 1,000 m (1,800 m). Largish lanky buteonine; long broad wings, medium tail, small head, longish neck/legs; wing-tips near tail-tip. Low flight, heavy beats; glides on cupped wings; soars high. Still-hunts; perches low, upright; often walks. Groups at fires/plough. [cf. 181/175/180]

**179a Adult** Mainly rufous, dark-barréd on neck and paler underbody; greyish face, slaty back/greater coverts; white band/thin tip on black tail. Flight below (**179ax**): rufous body/linings; fine-barréd pale rufous remiges with black border; tail looks pale with dark subterminal. Above (**179ay**): rufous with slaty body/greater coverts, black-edged wings, white on black tail.

**179b Juvenile** Dark brown above, edged buff; buff supercilia; mottled shoulders and barréd remiges both rufous; pale bands on mid or basal tail; cream to buff below, thinly streaked, but blotched/barréd black on chest-sides/flanks; more rufous thighs barréd black. Flight below (**179bx**): creamy with fine barring, darker chest-sides/thighs/wing-borders; barréd tail.

Text and map page 635



### 181 Black-collared Hawk *Busarellus nigricollis*

L47–58 cm (21 in): S115–143 cm (51 in): T16–21 cm (7 in): ♂84%

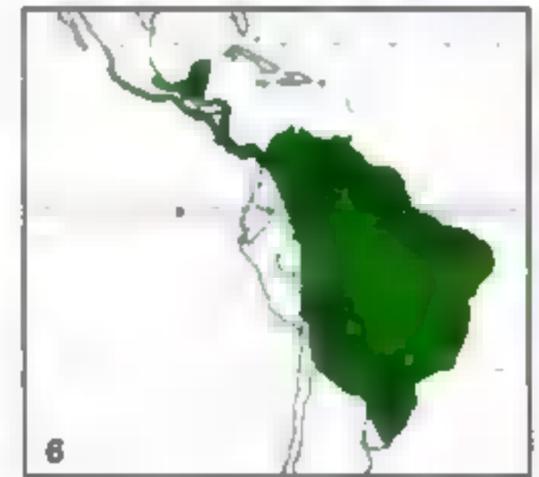
Mangroves, swamps, ricefields, forest rivers/lakes/ponds with floating vegetation, to 500 m (1,500 m). Largish bulky buteonine; long broad wings, short wide tail, small head; wing-tips almost to tail-tip. Soars on flat wings; sails over water, still-hunts from waterside branch/post, snatching fish at surface or plunging in shallows. Perches in open to dry. [cf. 179/175/180]

**181a Adult** (nominate; all but range of **b**) Mostly rufous, paler below and black-streaked above; fine-streaked creamy head, black dog-collar/wing-tips/tail-bars; cere black, legs blue-white. Flight below (**181ax**): rufous shades; head white; outer third and trailing edge of wings, collar and subterminal tail-band black. Above (**181ay**): also rufous/black; more streaks/bars.

**181b Adult** (*leucocephalus*; Paraguay/N Argentina) Larger; whiter head.

**181c Juvenile** Duller rufous, more streaked; collar broader, abdomen barréd. Flight below (**181cx**): barréd abdomen/linings/quills; dark wing-edges/subterminal tail-band; head/collar much as **a**.

Text and map page 639



### 180 Bay-winged Hawk *Parabuteo unicinctus*

L45–59 cm (20 in): S92–121 cm (42 in): T19–27 cm (9 in): ♂87%

Savannah, scrub, desert, often near water, to 1,500 m (1,900 m). Largish buteonine; paddle wings, longish tail/legs; wing-tips half down tail. Fast shallow beats; glides on cupped wings, wrists high; soars flat; seldom hovers. Low quartering; still-hunts. Social in winter. [cf. 175/dark buteos/29; c with juvenile buteonines]

**180a Adult** (*harrisi*; S USA–W Peru) Blackish with rufous shoulders/thighs; white tail-base/tip. Flight below (**180ax**): dusky body/remiges; rufous linings/thighs; white tail-base/tip. Above (**180ay**): rufous shoulders, two-tone tail.

**180b Adult** (nominate; S America but W Colombia–NW Peru) Smaller, tail slightly longer; greyer face; some whitish flecks below, esp mottling on flanks; slight barring on thighs. Flight (**180bx**): rufous linings somewhat mottled; white-based primaries; some barring on secondaries; tail also tends to bars towards base.

**180c Juvenile** (nominate) In flight. Buff body dark-blotched; linings and thighs barréd rufous/blackish; dark-tipped whitish primaries; thin-barréd grey secondaries/tail. Above (**180cx**): Dark brown, streaked buff on head; pale supercilia; edged rufous on body, broadly on shoulders; tail looks mainly dark with white base.

Text and map page 636





## PLATE 60: ENDEMIC CARIBBEAN AND PACIFIC ISLAND BUTEOS

### 188 Ridgway's Hawk *Buteo ridgwayi*

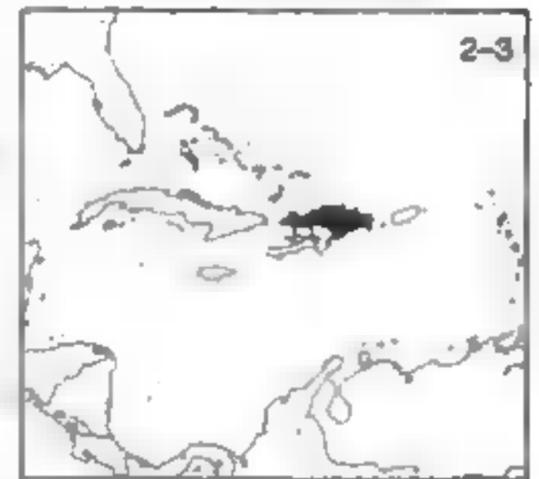
L:30–36 cm (13 in): S:69–81 cm (30 in): T:14–16 cm (6 in): ♂80%

Only Hispaniola and offshore islands; pine woods, scrub, mainly lowlands but to 2,000 m. Small long-legged buteo; rounded wings, medium tail. Rapid shallow accipiter-like beats/glides; glides with tips depressed; soars on flat wings. Solitary. [cf. 202/190]

**188a Adult male** Grey-brown above; greyer head thin-streaked blackish; rufous shoulders; dark tail thinly barred/tipped white; white throat, greyish chest; grey-white abdomen heavily barred rufous (strongest on thighs). Flight below (**188ax**): dark chest, pale rufous-banded body/linings; dark grey remiges and tail thinly white-banded. Above (**188ay**; ♀): rufous shoulders, obscure white tail-bars (♀ head browner/streakier than ♂).

**188b Juvenile** Dark grey-brown above, edged buff (no rufous); cream below, streaked brown/rufous. Flight below (**188bx**): linings as body; finely barred remiges/tail with wider sub-terminal.

Text and map page 652



### 194 Galapagos Hawk *Buteo galapagoensis*

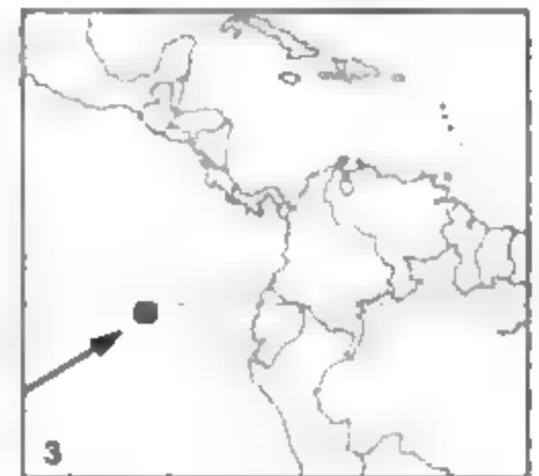
L:45–56 cm (20 in): S:116–140 cm (50 in): T:19–24 cm (8 in): ♂73%

Only Galapagos, where sole raptor (bar migrant 8/309) lava desert with cactus/thorn, crater uplands, to 1,700 m. Large buteo; long wings, longish tail; wing-tips reach tail-tip. Slow flexible beats; soars on V wings; hovers/kites. Forages in flight; still-hunts; catches insects/iguanas on foot.

**194a Adult (male)** Sooty-black, edged grey-brown/buff above and rufous on flanks/belly; some whitish mottling above; tail-coverts all barred white; grey tail thinly barred blackish. Flight below (**194ax**; ♀): linings black as body, but greater coverts barred; quills finely barred except bases of outer primaries. Above (**194ay**; ♂): black; obscurely barred quills, clearly barred rump. Dashing at land iguana *Conolophus subcristatus* (**194az**).

**194b Juvenile (female)** Dark brown above, edged/scaled whitish-buff; obscure eye-stripes/moustaches; creamy tail thinly barred blackish; buff below, spotted and blotched blackish; cere grey-green. [Rufous breast/abdomen at fledging; all paler brown and whitish in worn plumage.] Flight below (**194bx**; ♂): linings streaked as body, whitish-based primaries, fine-banded secondaries/tail.

Text and map page 667



### 200 Hawaiian Hawk *Buteo solitarius*

L:37–46 cm (16 in): S:87–101 cm (37 in): T:15–17 cm (6 in): ♂75%

Endemic to Hawaii, where sole raptor apart from vagrants (especially Osprey [8]) scattered trees, forest edge, to 2,700 m. Smallish compact buteo; medium wings, shortish tail. Rapid stiff beats mixed with glides.

**200a Pale juvenile (male)** Much paler head than c, flecked black, dusky eye-stripes; dark brown above, edged buff/whitish; whitish below, tinged sandy-rufous, sometimes few brown spots; cere bluish, legs greenish-yellow. [In worn plumage, head/under parts almost plain white.] Flight below (**200ax**; ♀): all pale; few or no marks on cream linings; flight-feathers/tail much as c.

**200b Dark adult (female)** All black-brown with some paler edges; throat whitish-streaked, cheeks, neck rufous-tinged. Flight below (**200bx**; ♂): blackish with rufous-tinged linings; quills as c.

**200c Pale adult (female)** Head-sides streaked grey-buff; dark brown above, faintly edged paler on scapulars/wing-coverts; whitish-buff below, streaked brown on breast/flanks. Flight below (**200cx**; ♂): brown streaks/blotches on breast/linings; white-based outer primaries; finely barred secondaries/tail.

**200d Dark juvenile (male)** Head/breast buff-streaked, belly/thighs less so. Flight below (**200dx**; ♀): body/linings between a and c.

Text and map page 677

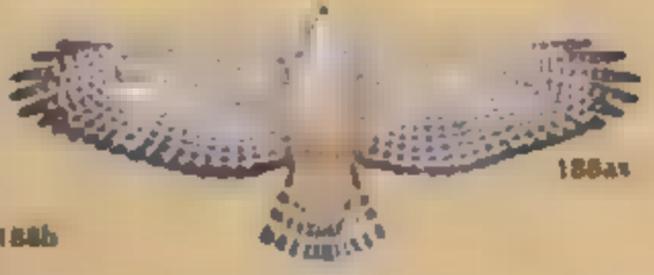




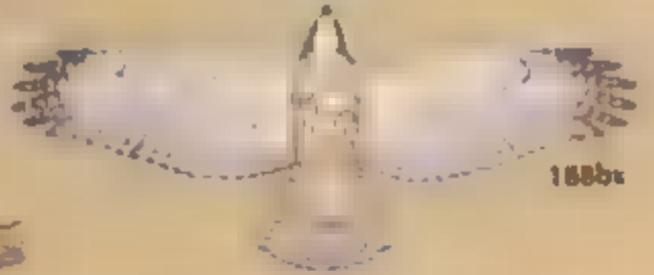
188av



188a



188at



188bt



194av



194at



194b



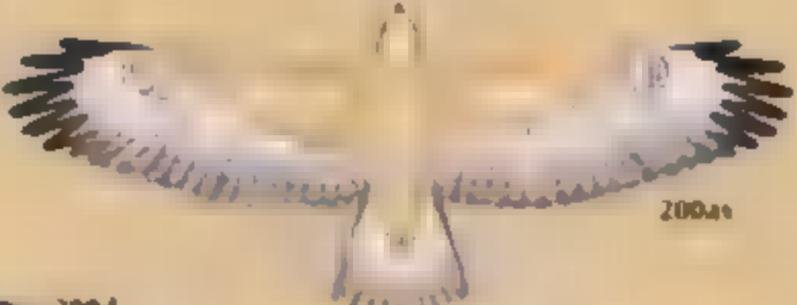
194bt



194ar



200bt



200at



200a



200b



200c



200d



200ct



200dt

## PLATE 61: NEOTROPICAL BUTEOS I

### 187 White-rumped Hawk *Buteo leucorrhous*

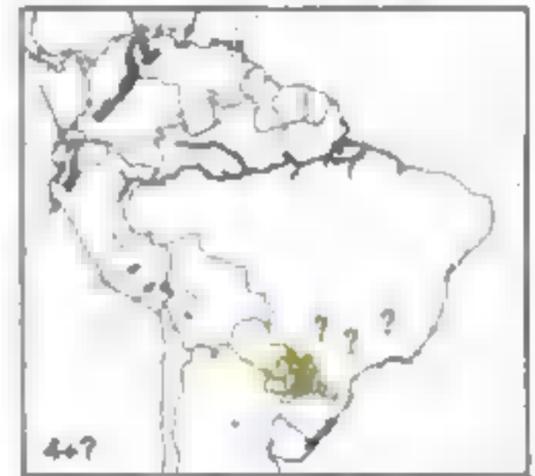
L33–40 cm (14 in): S67–79 cm (29 in): T14–17 cm (6 in): ♂84%

Humid mountain forest, esp clearings/edges on steep slopes, 1,500–2,900 m (500–8,560 ft). Small buteo; shortish wings, longish tail. Short whistled scream. Solitary. Flight pattern distinctive [cf. dark-morph buteos perched, especially 190]

**187a Adult** Mainly black; white rump/crissum; grey-brown tail-band; rufous thighs obscurely dark-banded. Flight below (**187ax**): black body; cream linings lightly spotted, black carpal arcs; barred remiges look dark; crissum and 2 tail-bands white. Above (**187ay**): black but for white rump, obscure tail-bands.

**187b Juvenile** Browner above; head streaked sandy-rufous; wing-coverts edged rufous; white rump; sandy-rufous below, breast heavily streaked blackish, thighs barred, crissum plain cream. Flight below (**187bx**): linings much less streaked than body, remiges clearly barred; pale crissum and white tail-bands much as **a**.

Text and map page 650



### 186 Roadside Hawk *Buteo magnirostris*

L31–42 cm (15 in): S64–92 cm (31 in): T13–19 cm (6 in): ♂80%

Forest/woodland edge, savannah, scrub, to 2,250 m (3,000 ft). Small accipiter-like buteo; shortish wings, longish tail/legs; wing-tips half down tail. Plumage very variable: 16+ races named. Still/shallow accipiter-like beats; glides on bowed wings, soars on flat, seldom high; does not hover. Still-hunts from pole/fence/wire; sluggish; not shy. Squealing *kree-yurr* or *kzurrrooo*. Solitary. [cf. 185/189/190/15c/accipiters]

**186a Adult** (nominate; E Colombia/E Ecuador/N Brazil) Head/back/chest all grey, but throat white-streaked; rufous patch on primaries; pale U on rump; tail banded grey/black; greyish below, barred rufous, crissum plain; eyes yellow, cere/legs orange. Flight below (**186ax**): grey chest; linings less barred than abdomen; barred remiges, rufous patch showing against sun; tail-bands.

**186b Adult** (*ovulatus*; E Peru/W Brazil/N Bolivia) Browner-grey above and on tail-bands; rufous on wing clearer, bars below extend into grey chest.

**186c Adult** (*magniplumis*; S Brazil into E Paraguay/NE Argentina) Larger; browner above, tail tinged rufous; dusky throat streakier; chest rufous.

**186d Adult** (*pucherani*; E Argentina/Uruguay) Largest race; very brown above, head blackish, chest rufous; larger and paler rufous wing-patch; pale tail-bands rufous; creamy underparts thinly barred rufous; eyes whitish-yellow. Flight below (**186dx**): black head and primary tips contrast pale body and finely barred wings; dark tail-bands thinner but for subterminal.

**186e Adult** (*petulans*; SW Costa Rica/SW Panama) Grey above, paler than **a**, grey chest spotted buff/rufous; throat whiter; prominent wing-patch; tail strongly tinged rufous; well barred below.

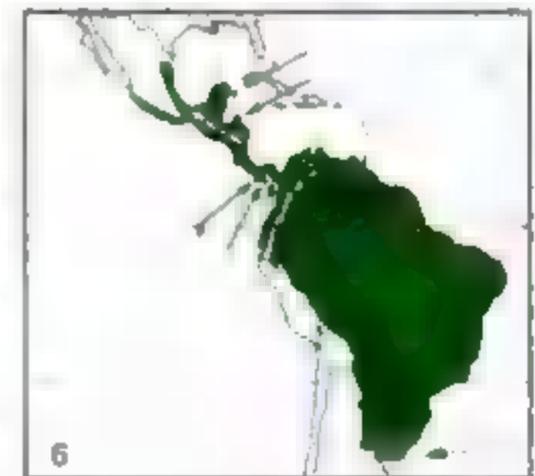
**186f Adult** (*griseicauda*; Mexico to NW Costa Rica) Brown above, often with greyish cast; much less rufous on primaries; grey-brown/dark brown tail-bands; throat/chest all streaked whitish; bold rufous barring below, finer on more rufous thighs; eyes orange-red. Flight below (**186fx**): less contrasted chest; boldly barred abdomen, but finely marked linings; primary tips barred.

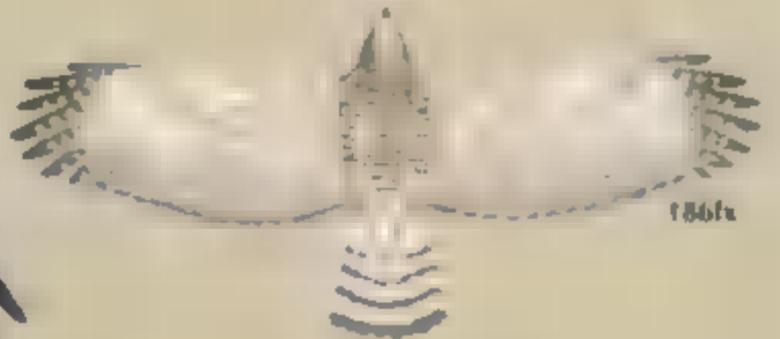
**186g Juvenile** (*griseicauda*) Browner above than **f**, edged buff; streaked head, creamy supercilia; 5–7 thinner dark bars on tail; buff-white below, streaked brown to breast, roughly barred with rufous wedges on belly, finely barred on thighs; eyes yellow-orange. Flight below (**186gx**): much as **f** but for more heavily streaked head/chest, more and thinner dark tail-bars.

**186h Juvenile** (*magniplumis*) In flight. Bolder chest-marks; 4–5 tail-bars.

**186i Juvenile** (*saturatus*; Bolivia/W Paraguay/NW Argentina) Larger than **g/h** and darker brown above; broader supercilia, clearer rufous wing-patches, and more contrasted tail; less streaked breast.

Text and map page 648





## PLATE 62: NEOTROPICAL BUTEOS II

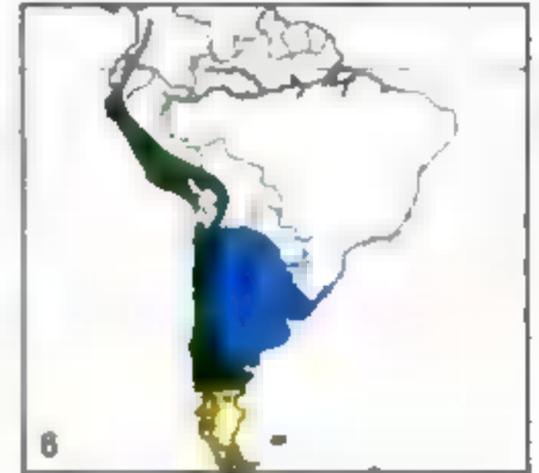
### 196 Red-backed Hawk *Buteo polyosoma*

L45–56 cm (20 in): S113–141 cm (50 in): T17–24 cm (8 in): ♂84%

Andean/Patagonian open country, 500–3,200 m (4,600 m). Big long-legged buteo; long wings rather pointed, medium tail rounded, as 195, but wing-tips not exceeding tail-tip. Flight/hunting much as 195. Variable plumages partly sex-linked. [cf. 198/195]

- 196a Pale adult male** Grey above; white-streaked forehead/cheeks; white tail with broad black subterminal, obscure cross-lines; white below, faintly barred grey on flanks. Flight below (196ax): white linings faintly barred; wing-tips dark, secondaries barred; white tail, black band. [♀s unknown in this plumage.]
- 196b Dark adult male** All dark slate; tail as a. Flight below (196bx): dark body; slate linings, greater coverts paler grey (form pale diagonal); quills as a, but bars/lines clearer. [♀s unknown in this plumage.]
- 196c Pale adult female** Often darker above than a; head/wings blackish, but mantle/scapulars rufous; as a below, or bars rufous, or whole abdomen barred. [Some ♂s have mantle all/part rufous.]
- 196d Dark adult female** Blackish-grey/chestnut above; throat/chest slaty, abdomen all chestnut. Flight below (196dx): chestnut body; dusky head, thighs and linings. [♂s unknown in this plumage.]
- 196e Barred adult female** Much as d above, but all barred slate-grey and whitish below, usually with variable rufous band on breast.
- 196f Pale juvenile** Blackish above, edged buff; tail thinly barred; whitish below, with dark moustaches, throat-stripe, streaks on breast, bars/arrowheads on abdomen; thighs barred rufous. Flight below (196fx): streaked whitish linings, more barred greater coverts; barred remiges pale-based; fine-barred tail.
- 196g Dark juvenile** All dull blackish; some white on nape; tail as f. Flight below (196gx): linings blackish like body, but greater coverts heavily barred; quills as f, looking more contrasted.
- 196h Rufous immature** As f, but mantle rufous, abdomen barred rufous.

Text and map page 671



### 197 Juan Fernández Hawk *Buteo exsul*

L48–54 cm (20 in): S1251–138 cm (51 in): T20–22 cm (8 in): ♂85%?

Endemic to Isla Alejandro Selkirk, outermost of group (some also now introduced on larger Isla Robinson Crusoe 160 km nearer S American mainland) volcanic rock slopes, to 1300+ m. Large buteo; shape as 196 and, though species sedentary, wings still long and relatively pointed; often treated as conspecific with 196, but, apart from isolation, sexes alike.

- 197a Adult (female)** Both sexes much like 196a, but darker grey above; upper head darker, with less white on forehead/cheeks; some paler scaling on mantle/wings, especially white on shoulders as leading edge to upperwing, but no trace of rufous; white below, but more barred on flanks/thighs/linings. [Juvenile very like 196f.]

Text and map page 673



### 198 Gurney's Hawk *Buteo poecilochrous*

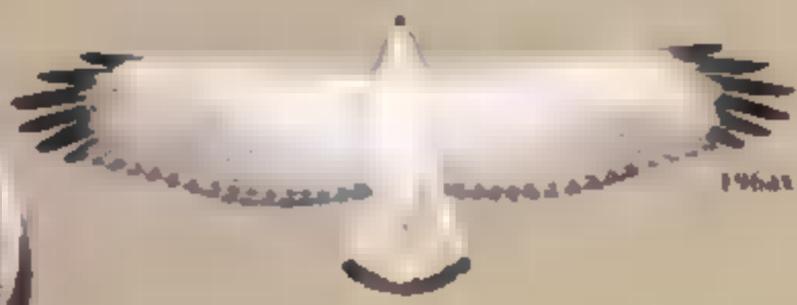
L52–62 cm (22 in): S133–151 cm (56 in): T21–26 cm (9 in): ♂91%

Mostly high plateaux, wooded valleys, near/above treeline, at 2,800–5,000 m, but down to 900 m in Colombia. Large buteo; often inseparable in field from 196, possibly conspecific, though bigger (some overlap) and with broader rounder hands. Plumages vary similarly, but no recorded equivalent of 196d, while barred morph, rare in 196 (e), is commonest in 197 (b).

- 198a Pale adult male** Grey above, white with few bars below, as 196a.
- 198b Barred adult female** Slaty head; barred wings, chestnut mantle/chest, barred slate/whitish below, as 196e. Flight below (198bx): all barred, but for dark head/chest, wing-tips, tail-band.
- 198c Dark adult female** Streaky throat, barred wings/thighs (cf 196d).
- 198d Pale juvenile** In flight. As 196fx, but markings bolder; scarcer.
- 198e Dark juvenile** In flight. As 196gx, perhaps inseparable; commoner.

Text and map page 674





## PLATE 63: NEOTROPICAL BUTEOS III

### 191 Short-tailed Hawk *Buteo brachyurus*

L37–44 cm (16 in): S83–103 cm (37 in): T13–18 cm (6 in): ♂76%

Humid forest, swamps, wooded savannah, pine-oak to 1,800 m (2,500 m). Smallish compact buteo; long wings reach tip of short tail. Stiff beats; glides on flat wings, tips upturned; soars in slight V. Hangs in wind, wings flat, tail spread, head down, then stoops; or drops by stages on V wings. [cf. 190bf; 193abde; 192; other dark buteonines]

**191a Adult (male)** (nominate; S America) Slaty-black above, white below; dark hood but white forehead/lores; dark subterminal band and thin bars (often broken) on greyish tail. [Dark morph rare.]

**191b Pale adult (female)** (*fuliginosus*; Florida, Panama) Browner above; in C America neck-sides may be rufous, nape whitish. Flight below (**191bx**: ♂): white linings/primary bases; thin bars on greyish quills; wider trailing wing-edges and subterminal tail-band.

**191c Dark adult (male)** (*fuliginosus*) All sooty-black but for whitish nape and forehead/lores; tail as **b**. Flight below (**191cx**: ♀): all dark but for black-tipped white primaries and barred greyish secondaries/tail as **bx**. (In Florida, dark morph the commoner.)

**191d Pale juvenile (male)** Edged pale above; light streaks on cheeks, dark on chest-sides. Flight below (**191dx**: ♀): more even tail-bars.

**191e Dark juvenile (female)** As **c**, but belly/linings mottled white (breast all dark in contrast); tail as **d**. Flight below (**191ex**: ♂).

Text and map page 659



### 192 White-throated Hawk *Buteo albigula*

L40–46 cm (17 in): S84–102 cm (37 in): T16–20 cm (7 in): ♂81%

Humid mountain forest at 1,700–3,500 m, especially open stunted trees at 2,500+ m; in Patagonia down to 1,000 m in wooded foothills. Small buteo; similar to **191** (often treated as conspecific) but longer-tailed; wing-tips fall short of tail-tip. [cf. 191; b196f; 198d; 190f; 193d]

**192a Adult (male)** Black-brown above, white below; dark hood, white forehead/lores; brown tail with several black bars, barely wider subterminal band; chest-sides rufous; dark streaks on flanks form solid patch above rufous-banded thighs. Flight below (**192ax**: ♂): linings patchily streaked; quills as **191b**.

**192b Juvenile (female)** Edged paler/more streaked; cheeks and chest-sides streaked; buff thighs barred brown. Flight below (**192bx**: ♀): more blotched linings; rather like 190f but for plain throat, heavier flank marks, finer-banded tail, greyish secondaries.

Text and map page 662



### 201 Rufous-tailed Hawk *Buteo ventralis*

L45–54 cm (19 in): S114–139 cm (50 in): T19–24 cm (8 in): ♂74%

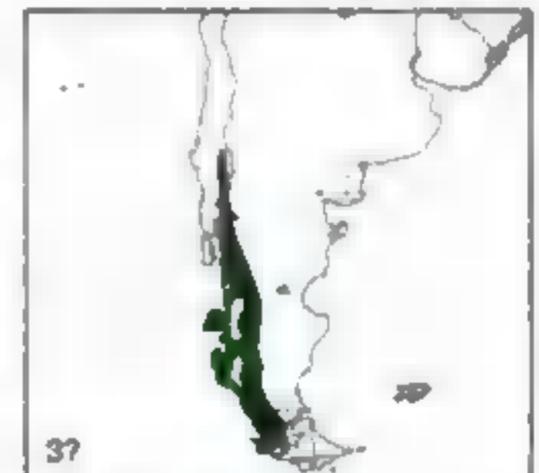
Forest edge, woodland, to 1,200+ m. Largish buteo; long broad squarish-tipped wings, medium-longish tail; wing-tips almost to tail-tip. Until 1940s confused with polymorphic **196**, though far more like N American **202**, with which forms superspecies. [cf. 196bfh]

**201a Pale adult (male)** Blackish above, edged paler; black-banded rufous tail, wider subterminal; rufous nape/cheeks, dark moustaches; cream/rufous below, streaked black, esp. flanks/belly; thighs barred darker rufous. Flight below (**201ax**: ♀): dark-blotched belly-band; dark patagia and carpal area; barred secondaries dark-tipped; pinkish-grey tail barred, with subterminal band.

**201b Dark adult (female)** All sooty-black with barred tail. Flight below (**201bx**: ♂): dark but for barred quills as **a**, but contrast can make tail look paler.

**201c Pale juvenile (female)** Wings/rump boldly edged rufous/cream, forming V on scapulars/greater coverts; dark-banded greyish tail; white below, blotched blackish on flanks/belly, spotted on thighs. Flight below (**201cx**: ♀): as **a** but whiter; clearer belly-band; streakier wing-linings; narrower subterminal bands on wings and tail.

Text and map page 679



191b

191c

191e

191ba

191ca

191da

191ea

192a

192b

201b

201a

201c



191a

191d



192b



192a

192a



192b

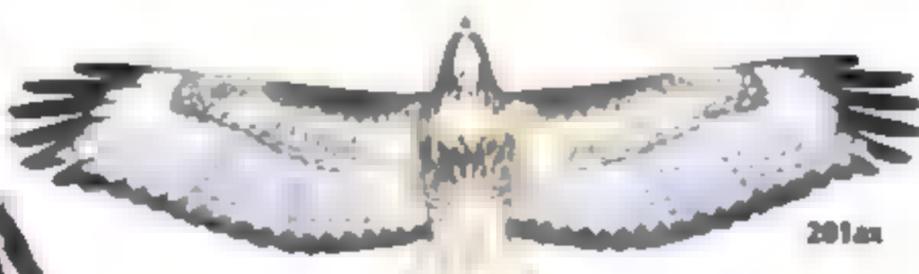


201b

201a



201b



201a



201c



201c

## PLATE 64: NEOTROPICAL BUTEOS IV

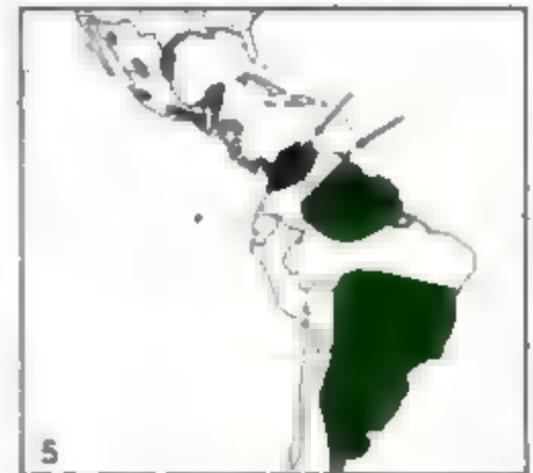
### 195 White-tailed Hawk *Buteo albicaudatus*

L44–60 cm (20 in): S118–143 cm (51 in): T19–22 cm (8 in): ♂82%

Savannah, scrub, ranchland, hillsides, mainly below 1,000 m (recorded to 2,400 m). Big buteo: long wings rather pointed, pinched in at rear base; shortish tail, long legs; wing-tips exceed tail-tip. Slow heavy beats; glides with arms raised, hands flat; soars on V wings; hovers and kites. Concentrations at fires; also of jays in winter. [cf. 191/193/196/198/202e/208; 172 from below; **b** especially 196, 198]

- 195a Pale adult** (nominate; S Brazil/N Argentina) Dark slate above; blackish head extending to throat-sides (W Argentina) or whole throat, but white over lores; rufous shoulders; white rump/tail with grey lines, black subterminal band; white below, flanks barred. Flight below (**195ax**: ♂): more or less black throat; linings/secondaries barred; inner primaries darker, white patch on outers. Above (**195ay**): all dark with hood, rufous shoulders, but for white tail with black band.
- 195b Dark adult** (nominate) All blackish but for tail as **a**, usually dark bars on rump and some rufous on shoulders. Flight below (**195bx**: ♀): body/linings black; greater coverts/quills as **ax**.
- 195c Dark adult** (*colonus*; E Colombia/N Brazil, Aruba/Trinidad) All slaty but variable rufous on shoulders, grey/rufous-banded flanks/thighs, white or barred crissum, tail as **a**. Flight below (**195cx**: ♂): as **bx**, but body/linings mainly slaty. [Pale adult as **d**, but smaller; paler above; sometimes dark throat.]
- 195d Adult** (*hypospodius*; Texas/W Colombia) Slaty above (♀s darker) but for white over lores, chestnut shoulders, white rump; tail as **a**; all white below, so dark cheeks give hooded look, but flanks/belly often slightly barred (♀s more). Flight below (**195dx**: ♀): white linings, barred greyish remiges, dusky rear edge and carpal arc; usually white patch on outer primaries.
- 195e Juvenile** (*hypospodius*) Mainly black-brown, edged tawny above; white U above base of finely barred greyish tail; variably streaked cream below or breast-patch as **f**, crissum/thighs edged white. Flight below (**195ex**: ♂): remiges as **dx** but, conversely, paler than white-mottled dark linings; barred tail, no broad subterminal.
- 195f Dark juvenile** (*colonus*) All black-brown but for some rufous edges; breast may be all dark or as shown. Flight below (**195fx**: ♀): body/linings more or less dark; greater coverts/quills as **e**.

Text and map page 668



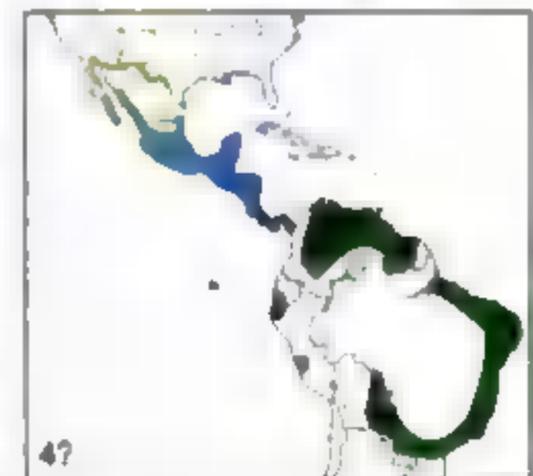
### 199 Zone-tailed Hawk *Buteo albonotatus*

L46–56 cm (20 in): S117–140 cm (51 in): T19–24 cm (8 in): ♂79%

Forest, woodland, scrub, riverine trees, canyons, mountains, to 2,600 m. Large buteo: long slender parallel-edged wings, longish tail; wing-tips reach tail-tip. Slow loose beats; may soar on flat wings with spread tail, but often sails tilting on V wings like small Turkey Vulture [2], which it resembles in shape/two-tone pattern and may even accompany; hunts on wing by stooping, and this mimicry apparently enables closer approach to its prey. [cf. 2; **b**193b/195f; other dark buteos]

- 199a Adult (male)** Slaty-black but for white forehead, pale grey lores; one broad and 1–2 thin grey tail-bands (2nd thin bar indicates ♀, but may be obscure, mottled or hidden by coverts). Flight below (**199ax**: ♀): slaty-black linings contrast barred greyish remiges; tail-bands now white. Above (**199ay**): black with grey tail-bands; sometimes white bases showing through on nape.
- 199b Juvenile** All browner; body spotted white, esp below; grey-brown tail with 5–7 narrow black bars and wider subterminal band. Flight below (**199bx**): linings as body, but greater coverts mottled; remiges whiter than **ax**; barred tail greyish-white.

Text and map page 675





## PLATE 65: SMALL NEARCTIC/NEOTROPICAL BUTEOs

### 185 Grey-lined Hawk *Buteo nitidus*

L:36–46 cm (16 in): S:75–94 cm (33 in): T:14–20 cm (7 in): ♂87%

Wet forest fringes, especially riverine, to dry woodland and timbered savannah, especially near water, to 800 m (1,500 m). Small compact accipiter-like buteo; tips of relatively short wings only half down longish tail. Dashing flight, rapid beats, short glides; glides/soars on flat wings. Still-hunts, chases, or stoops. Northern form (**a**; **d**) has been treated as distinct species. [cf. 186/165/167: 15a; **de** 190f: 180ghi: 149c/177c]

**185a Adult** (*plagiatus*; far S USA-NW Costa Rica) Rather uniform grey above, obscurely dark-banded and black-shafted; white U on rump; 2 white bands on black tail (upper thinner, often hidden); closely grey-banded white below, but stippled throat, plain crissum; eyes brown. Flight below (**185ax**): banded body, whitish wings more lightly marked; 2–3 uneven white bands on greyer tail. Above (**185ay**): white tail-bands, U on rump.

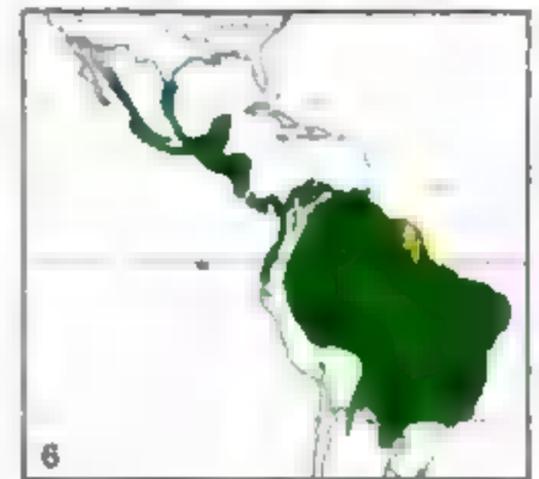
**185b Adult** (nominate; Trinidad: Amazonia) Intermediate; eyes yellow.

**185c Adult** (*pallidus*; Bolivia–S Brazil–N Argentina) Palest grey above, clear barring; paler below, cheeks/throat/mid-chest almost plain; eyes yellow. Flight below (**185cx**): whitish linings, more barred remiges. Above (**185cy**): banded tail more obvious, but thinner bar may be absent and white U on rump much reduced.

**185d Juvenile** (*plagiatus*) Black-brown above, edged/blotched rufous; 5+ dark bars on brown tail; creamy supercilia/cheeks/throat and contrasting dark eye-stripes/moustaches; creamy-white below, blotched dusky on breast, stronger on flanks/belly, barred on thighs. Flight below (**185dx**): wings more barred than **a**, but still look whitish; body-blotches; multibanded tail.

**185e Juvenile** (*pallidus*) Browner above, marked buff; contrasted tail with broader buff and blackish bands; cheeks whiter, facial stripes finer; white below, blotched sooty; thighs less barred/plain. Flight below (**185ex**): whiter than **d**; tail more contrasted.

Text and map page 646



### 190 Broad-winged Hawk *Buteo platypterus*

L:32–42 cm (15 in): S:74–96 cm (33 in): T:15–19 cm (7 in): ♂82%

Forest, open woods, mostly lowland; also mountains to 3,000 m (4,000 m) in winter. Small stocky buteo; rather pointed wings, longish tail; wing-tips well short of tail-tip. Strong stiff beats; glides/soars on flat wings; no hover. Migrates in huge loose circling flocks. [cf. 186/189, and 31/149/153; f185de/191d/192b; b193b]

**190a Pale adult** (nominate; mainland) Dark grey-brown above, edged paler; broad white band on black tail, second thinner bar partly hidden; white below, heavily mottled/banded rufous, more lightly on belly/thighs, crissum plain. Flight below (**190ax**): wings mainly white, rufous spots on coverts, dark trailing edges; body more heavily marked; tail showing second white bar when spread. Above (**190ay**): dark but for white tail-band(s).

**190b Dark adult** (nominate; rare, breeds Alberta) Body/coverts dark brown; tail as **a**; underwings two-toned, with silvery remiges.

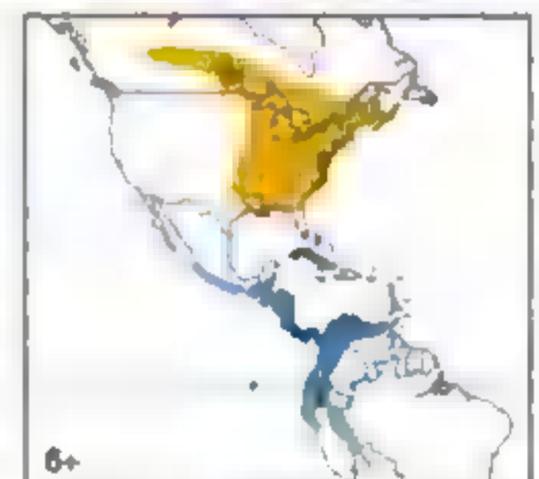
**190c Adult** (*cubanensis*; Cuba) Smaller; streaky below, more like imm **f**.

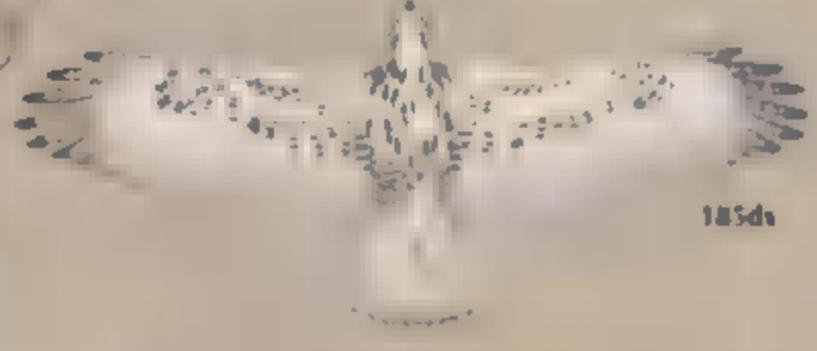
**190d Adult** (*insulicola*; Antigua) Smallest, palest of small W Indian races; paler brown above, edged still paler; whiter below with clearer throat, lighter breast-streaks and flank-bars.

**190e Adult** (*antillarum*; St Vincent-Tobago) In flight. Like smallish **a**, but breast more solidly rufous, linings also tinged rufous.

**190f Juvenile** (nominate) Dark brown above, edged white or rufous; tail paler, 4–5 dusky bars; pale supercilia, blackish moustaches; white below, streaked/blotched brown (some heavily, others almost unmarked on breast); thighs plain or spotted, rarely barred. Flight below (**190fx**): wings as **ax**, but rear edge less dark, square window on primaries; variably streaked body, barred tail.

Text and map page 656





## PLATE 66: NEARCTIC BUTEOS I

### 193 Swainson's Hawk *Buteo swainsoni*

L43–55 cm (19 in): S117–137 cm (50 in): T19–23 cm (8 in): ♂88%

Plains, prairies, tundra, semi-desert, fields, to 1,500 m (2,800 m on passage). Largish slender buteo; long wings rather pointed, longish tail; wing-tips reach tail-tip. Light moderate beats; glides with arms raised, hands flat; soars rocking on angled V wings; often hovers and kites. Perches on fences, ground; follows tractors. Migrates in flocks. [cf. **a**191/195; **b**dark morph buteos, esp. 195f (see plates 61–68); **d**201/202h/303]

**193a Pale adult** Brown above, thinly edged rufous-buff; grey-brown tail finely dark-banded, pale U on coverts; white forehead and large throat-patch; rufous to dark brown breast-band (may be incomplete); whitish belly sometimes dark-banded (esp. ♀s). Flight below (**193ax**): two-tone with white linings, faintly banded dark greyish remiges; variably obvious carpal arcs; dark breast. Above, in circling flock (**193ay**): pale U above barred tail.

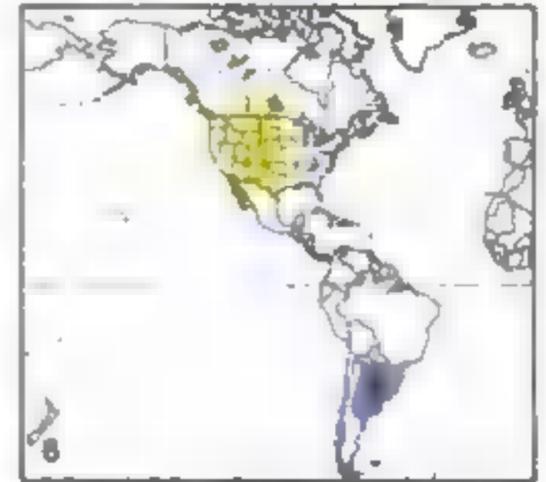
**193b Dark adult** All sooty-brown (rarely black) with barred tail and usually barred whitish crissum; often pale U over tail, some white on forehead/throat. Flight below (**193bx**): linings dark brown, rufous-buff or mottled white, showing little contrast.

**193c Rufous adult** Belly/thighs dark rufous, or whitish and banded dark rufous like crissum. Flight below (**193cx**): rufous or mottled rufous linings showing some contrast with dark grey remiges.

**193d Pale juvenile** Streaked crown; buff supercilia/cheeks/throat, dark eye-stripes/moustaches; broad buff edges above; pale U above barred tail; creamy-white below, spotted or blotched dark brown. Flight below (**193dx**): still two-toned, but less contrast between spotted creamy linings and barred remiges; tail as **a**.

**193e Dark and rufous juvenile** (**193ex**) Buff to rufous below, blotched dusky (esp. belly/thighs).

Text and map page 663



### 208 Ferruginous Hawk *Buteo regalis*

L50–66 cm (23 in): S134–152 cm (56 in): T23–25 cm (9 in): ♂95%

Plains, desert uplands, dry open country, to 1,500+ m (2,000 m in winter). Large robust buteo; long tapered wings, medium tail, big head, long gape, feathered legs; wing-tips almost reach tail-tip. Strong slow eagle-like beats; glides with shallow V wings, or hands flat; soars in deeper V; hovers. Perches trees/fences/mounds; roosts communally. Quarters, stoops from height, still-hunts. [cf. **ae**202adf/209cd; **b**dark buteos 190/191/193/195/199; **d**209 immatures]

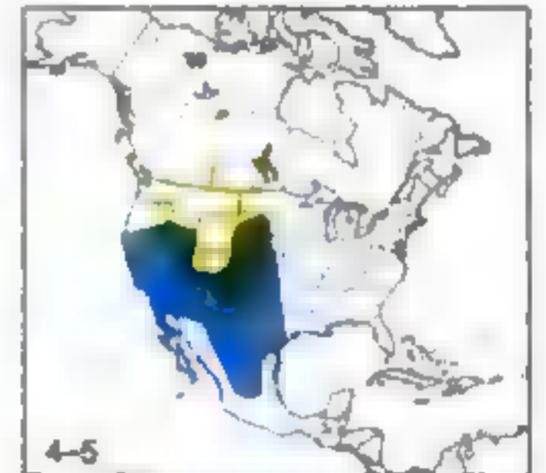
**208a Pale adult** Dark brown above, broadly edged rufous; crown/nape streaked rufous or cream; tail white, pale grey or rufous (or mixed), speckled grey; cheeks whitish, dark line behind eyes; white below; thighs banded rufous, or rufous with dark bars. (Prey: common prairie-dog *Cynomys ludovicianus*.) Flight below (**208ax**): whitish wings with dark carpal arcs, usually rufous mottling on linings (especially ♀s); rufous thighs obvious. Above (**208ay**): dark but for pale tail, whitish patch on primaries.

**208b Dark adult** Browner above, thinly edged rufous; grey tail variably mottled darker; dark rufous below, or dark brown (**bx**), with some white breast-streaks; chestnut crissum. Flight below (**208by**): all rufous or dark brown with silvery quills; darker trailing wing-edges; white inside carpal arcs.

**208c Pale juvenile** Much less rufous above than **a**; grey-brown tail with black-spotted white base; white below, dark-blotched/spotted on flanks/thighs, sometimes also in band on chest or belly. Flight below (**208cx**): white wings with dark carpal arcs, some spots on linings; silvery-grey tail with subterminal band.

**208d Dark juvenile** Flight below. All dark brown, breast sometimes more rufous, with contrasting silvery remiges (dark trailing edge) and tail (subterminal band); white inside carpal arcs.

Text and map page 702



193ay

193a



193ax

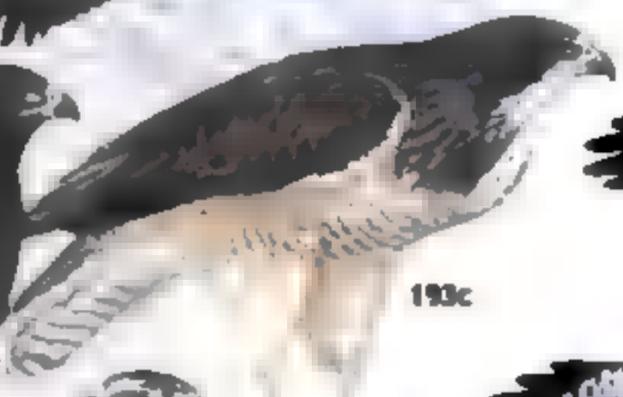


193bx



193cx

193c



193dx



193ex

193b



193d



193e



200ay



200ax



200a



200b



200bx



200by



200cx

200c



200d

## PLATE 67: NEARCTIC BUTEOS II

### 189 Red-shouldered Hawk *Buteo lineatus*

L38–47 cm (17 in): S91–114 cm (40 in): T16–24 cm (8 in): ♂85%

Moist woods, riparian forest, often by water, in W also drier woods, to 1000 m (migrants/winter to 2500 m); widespread Florida. Mid-sized/largish slender buteo; longish tail/legs; wing-tips short of tail-tip. Stiff shallow accipiter-like beats; glides on bowed wings, soars on flat; does not hover. Unobtrusive (less so in W/SE USA, Mexico). [cf. c190f; a190a/94c; see also 153f]

**189a Adult** (nominate; E N America) Dark above, edged rufous, head tawny-streaked; rufous shoulders, white-banded black wings; tail black with 3–4 thin white bars; rufous below with black streaks, whitish barring. Flight below (**189ax**): barred rufous body; linings darker than barred whitish remiges; white window crescents on wing-ends; banded tail.

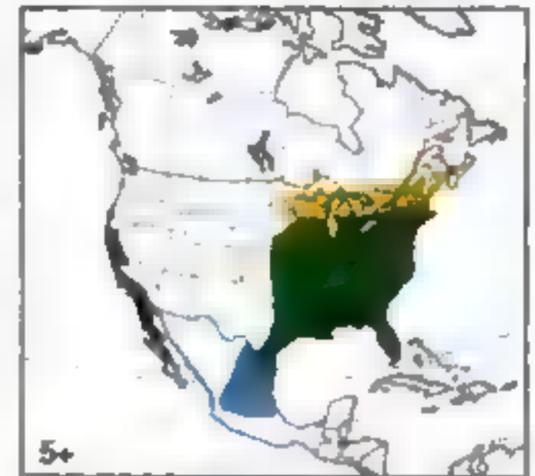
Above (**189ay**): window arcs, chequered remiges; red shoulders;

banded tail. [S Florida race smaller, paler; grey head, greyish back, 2–3 tail-bars. Texas race redder above.]

**189b Adult** (*elegans*; W N America) Smaller; brighter; breast/shoulders solid rufous; 3–4 tail-bars.

**189c Juvenile** (nominate) More mottled tawny, whitish above; paler head, buff supercilia, dark moustaches; hint of rufous shoulders, pale U on rump; 7–8 bars on rufous-based tail; white below with dark blobs. Flight below (**189cx**): plain or lightly spotted creamy linings, tawny window arc on wing-ends, blotched body, many tail-bars.

Text and map page 653



### 202 Red-tailed Hawk *Buteo jamaicensis*

L45–58 cm (20 in): S107–141 cm (49 in): T20–25 cm (9 in): ♂82%

Woods, open country, deserts, mountains, to 3,200 m. Large buteo; broad wings, longish tail; wing-tips reach tail-tip in W races. Slow deep beats; glides on flat wings or hands slightly down; soars often in shallow V; hovers and kites. Perches openly. Social in winter and on migration. [208; e209ef; i190f; other buteos]

**202a Adult** (*borealis*; E N America) Dark above, edged, mottled white (often in V on back, U on rump), with paler hooded head, dark moustaches; rufous tail, thin subterminal band; white below, often chest-sides rufous and belly streaked. Flight below (**202ax**): linings white or washed rufous; dark leading edges and carpal arcs; usually belly-band; tail can look pinkish.

**202b Dark adult** (*calurus*; W N America) Blackish; rufous tail with wider subterminal, often also thin bars. [Commoner pale adult as a, but darker, redder; barred flanks/thighs, variably barred tail.]

**202c Rufous adult** (*calurus*) Blackish above; 7–11 thin bars on rufous tail; rufous below, solid belly-band, barred thighs, crissum [not streaked as shown]. Flight (**202cx**): rufous wing-linings with dark leading edges [belly-band stronger, tail more rufous than shown].

**202d Adult Krider's** (rather rare whitish morph of a in Great Plains) Much mottled white above, head and pink-tipped tail whitish; all white below. Flight below (**202dx**): no belly-band, dark leading edges to linings reduced, absent.

**202e Adult** (*harlani*; Alaska/Yukon/N British Columbia, wintering USA) Black, variably mottled pale grey; whitish to dark grey mottled tail, dark band usually at end, sometimes 6–8 thin bars (but tail pattern/colour very variable). Flight (**202ex**): black, some speckling; white-streaked breast, often pale throat; dark rear edges to barred remiges; greyish tail.

**202f Pale Adult** (*harlani*) In flight. Rare; much as d, but body/linings more marked; tail varies as e (again often subterminal band).

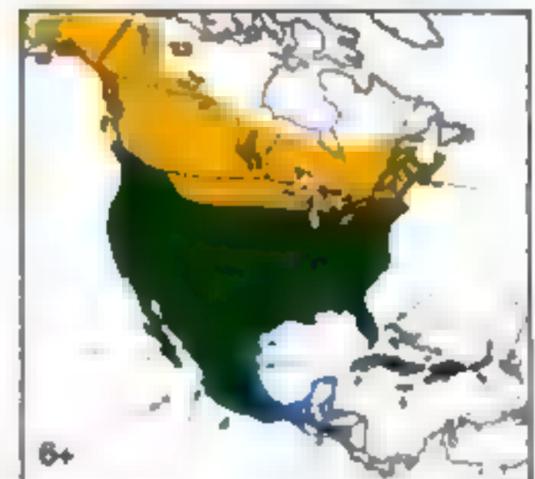
**202g Adult** (nominate; W Indies) In flight. Smaller; streaked breast, heavy belly-band, clear dark leading wing-edges; rufous tail.

**202h Juvenile** (*borealis*) Paler head than a; whiter below; belly-band and V on back clearer; dark-banded brown tail often rufous-washed. Flight (**202hx**): whiter linings with less clear dark leading edges; thinner trailing edges to remiges; squarer pale primary-windows.

**202i Dark juvenile** (*calurus*) In flight. Dark brown body/linings, linings sometimes mottled rufous-buff; tail rarely with rufous wash, bars may be broader than on pale juvs (e.g. h); outer primaries with black tips.

**202j Juvenile** (*harlani*) In flight. Like i, but blacker, usually streaked white on breast, mottled on belly/linings; bar-tipped outer primaries, no band on trailing wing-edges; tail-bars wavier.

Text and map page 681





189ax



189cx



189a



189ay



189b



202ax



189c



202cx



202ax



202a



202f



202a



202dx



202b



202g



202c



202bx



202d



202i



202h



202j

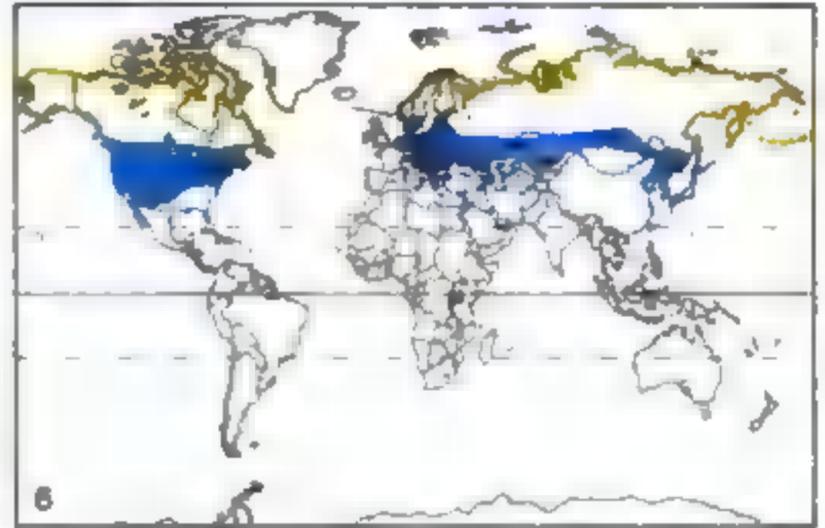
## PLATE 68: ROUGH-LEGGED AND UPLAND BUZZARDS

### 209 Rough-legged Buzzard *Buteo lagopus*

Text and map page 704

L45–62 cm (21 in); S120–153 cm (54 in); T20–26 cm (9 in); ♂85%

Tundra, thin taiga, to 1,200 m; winters wetlands, farmland, moorland, steppe. Large bulky buteo; long wings, longish tail, feathered legs; wing-tips reach tail-tip. Slow loose beats; glides/soars with arms raised, hands flatter; hovers with deep beats, or flutters, or kites; still-hunts from low perch. Gregarious on migration; winter roosts. [cf. 203/206/207; e202e (juvenile)208d; f224c]



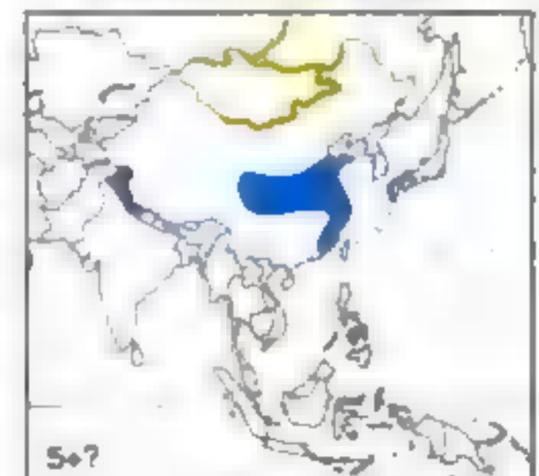
- 209a Adult** (nominate; Eurasia to Yenisey) Black-brown above, marked brown/rufous; cream; dark-streaked whitish head; white-based tail greyer near tip, with subterminal band and 0–1 bars (especially ♀) to several bars (especially ♂); variably dark-blotched on cream below, most on flanks; pale U on breast. Flight below (**209ax**: y/z) variable U; cream linings more or less streaked dark brown; black carpals/wing-tips; white quills variably barred, subterminal band.
- 209b Adult** (*menzbieri*; NE Siberia) Averages larger; generally paler. Flight below (**209bx**): abdomen less marked, tail-bars thinner. Above (**209by**): dark with paler head, small whitish patch at base of outer primaries, white-based tail [a similar above].
- 209c Adult male** (*sanctijohannis*; N America) Dark grey-brown above, edged white/tawny; paler streaked head; white tail, dark subterminal band and 2–3+ broken bars; breast more marked than abdomen (mid-belly may be plain), creamy U between. Flight below (**209cx**): pale belly, mottled carpals, barred tail. [Some ♀s similar.]
- 209d Adult female** (*sanctijohannis*) Flight below. Browner above; belly well marked, even as solid band, so pale U emphasised; white tail greyer near tip, usually single subterminal band; white underwings with dark-spotted linings, some barring and dark subterminal band on secondaries, black carpal patches. [Some ♂s similar.]
- 209e Dark adult (female)** (*sanctijohannis*) Much darker black-brown than **ax** [♂ blacker]; tail with just dark subterminal (♀) or 3–4 additional thin white bars (♂). Flight below (**209ex**: ♂): blackish linings; dark-barred silvery remiges; silvery tail with subterminal band (most ♀s) or several bars (most ♂s).
- 209f Juvenile** (nominate) Browner above than **a**; white head less streaked, moustaches fainter; white tail shades into brown towards tip; chest/thighs less marked but belly/flanks often solidly dark. Flight below (**209fx**: ♂): paler than **ax**, creamy but for belly-patch, carpals, wing-tips and brownish tail-end; usually streaks on throat/breast, linings, slight bars (but no subterminal band) on secondaries. Above (**209fy**) big windows; dark distal tail.

### 207 Upland Buzzard *Buteo hemilasius*

Text and map page 700

L57–67 cm (24 in); S143–161 cm (60 in); T25–28 cm (10 in); ♂81%

Open steppe, desert, mountains, 1000–4500 m (500–5000+ m), locally to sea-level in winter. Large eagle-like buteo; long wings, longish tail; wing-tips near tail-tip. Deep flexible beats; glides with arms slightly raised, wrists forward, hands flat; soars in V; often hovers. Formerly thought conspecific with **206**. [cf. 206/209/203]



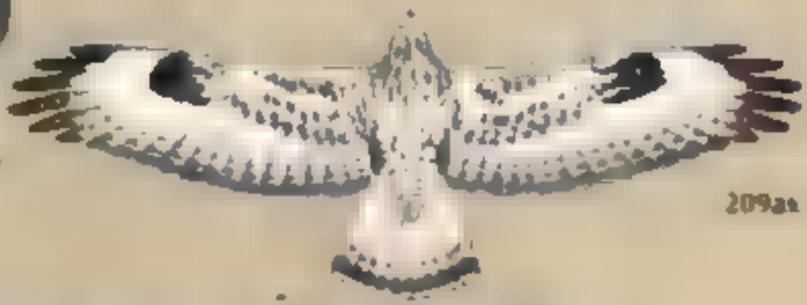
- 207a Pale adult (male)** Brown/grey-brown above, edged tawny/rufous; pale streaky head; brownish-white tail, usually 2–3 distal bars; white/pale rufous below, chest-streaks, flank/thigh-patches, some bars elsewhere. Flight below (**207ax**: ♀): linings darker rufous than body, some streaks; black carpals and wing-tips; whitish remiges, some bars on secondaries, darker rear edges; whitish tail barred near tip. Above (**207ay**: ♂): streaky head; whitish windows; brownish-white tail, slight distal barring.
- 207b Dark adult (female)** Flight below. Mainly black-brown; grey remiges, broken white bars at bases; small whitish primary-patches (cf. **206**); thin dark bars and broad subterminal on whitish tail.
- 207c Juvenile (male)** As **a** but streakier below; browner tail more barred. Flight below (**207cx**): body/linings more streaked; secondaries more barred, dark on rear edges less clear; tail all barred.



209bv



209bv



209av



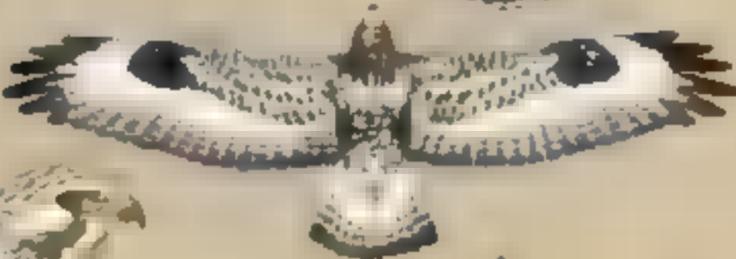
209a



209i



209b



209av



209az



209tc



209bx



209c



209c



209d



209cx



207a



207ay



209ex



207c



207ax



207cx



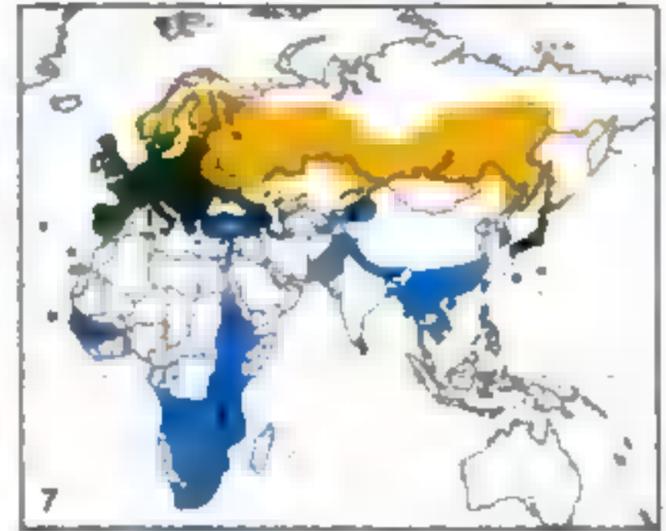
207b

## PLATE 69: COMMON AND MADAGASCAR BUZZARDS

### 203 Common Buzzard *Buteo buteo*

Text and map page 686

L40–52 cm (18 in); S109–136 cm (48 in); T17–23 cm (8 in); ♂85%  
Wooded, open country, rocky coasts, uplands, to 2,500+ m (4500 m on migration). Compact buteo; broad wings so tail looks short; wing-tips reach tail-tip. Fast stiff beats; glides on flattish wings or hands lowered; soars in shallow V; hovers. Sometimes treated as conspecific with 202. Mewing *per-yow*. Hunts from flight, perch, even on foot. Solitary; flocks on migration. [cf. 18/19/206/207/209/67/230; Afr also 204/210]

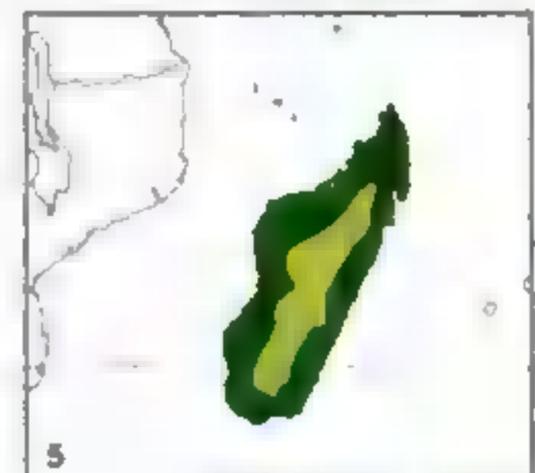


- 203a Medium adult** (nominate; W/C Europe, Atlantic Is) Very variable; often darkish brown above, thinly edged rufous; grey-brown tail with dark bars, broader subterminal; streaked throat; grey-brown to red-brown breast above pale U; barred abdomen, sides darkest; eyes dark brown. Flight below (**203ax**): linings barred brown and mottled grey, rufous; variably distinct carpals; whitish-based primaries, barred and dark-tipped secondaries; tail-bars and subterminal band. Above (**203ay**): body/coverts paler than remiges; barred tail.
- 203b Darkest adult** (nominate) Black-brown but for variable U on breast, variably paler crissum, sometimes strip joining these areas; creamy throat-streaks; tail as a. Flight below (**203bx**): blackish linings spotted/barréd rufous, white; dark carpals; quills as a. Above (**203by**): mostly dark; obscure tail-bars.
- 203c palest adult** (nominate) Largely white; more or less dark centres above, scattered streaks below, bars/arrowheads on flanks; white cheeks, thin moustaches. Flight below (**203cx**): may be all white but for dark carpal arcs, wing-tips, rear edges, subterminal tail-band; some barring on remiges/distal tail.
- 203d Rufous adult** (*vulpinus*; N/E Europe, Asia to Yenisey) Much as a but tone warm brown to rich rufous (some all blotched below or solid rufous); more or less rufous tail with reduced bars. Flight below (**203dx**): pattern often as ax, with pale U on breast, but rufous tinge to body/linings, pinkish-cream tail; whiter-based primaries, often dark rear wing-edges clearer, but often no more than hint of black on carpals (cf. 206). Above (**203dy**): whitish patch on primaries; rufous tail usually barred, but sometimes even subterminal band absent (cf. 206).
- 203e Dark adult** (*vulpinus*) Flight below. Dark brown, with/without U on breast and fine or faint mottling on belly; quills as d, trailing edges striking.
- 203f Adult** (*japonicus*; E Asia) Less rufous, more as a, but pale below with plain creamy breast, barred belly/flanks, usually plain thighs [not barred as shown here]; brown tail faintly barred, or plain but for rather indistinct subterminal band; feathers extend farther down tarsi. Flight below (**203fx**): broad cream strip across breast/median coverts behind darker head, forearms; tail-barring variable.
- 203g Juvenile** (nominate) Flight below. As a (varying as a-c), but more streaked on belly/linings; eyes pale grey to light brownish; overhead, trailing wing-bands and subterminal tail-bar much thinner.
- 203h Juvenile** (*vulpinus*) Indistinguishable from g unless showing rufous.

### 205 Madagascar Buzzard *Buteo brachypterus*

Text and map page 695

L40–48 cm (17 in); S93–111 cm (40 in); T16–20 cm (7 in); ♂94%  
Forest edge, woodland, wooded savannah, scrub, cultivation, to 2,300 m. Mid-sized stocky buteo; short wide head, shortish broad wings, tail. Perches openly; soars. Hunts from perch, flight. [cf. 10/perhaps also vagrant 203d?]



- 205a Adult** Dark brown above, edged paler, dark bands on brown tail, subterminal widest; white below, streaked/blotched brown on throat/chest/flanks, lower breast plain; thighs dark-barréd rufous; cere blue [not yellow as shown], feet whitish/yellowish. Flight below (**205ax**): lesser coverts dark as head, medians blotched, and greater's barréd; white-based primaries, barred and dark-tipped secondaries; banded tail. Above (**205ay**): dark; white base to banded tail.
- 205b Juvenile** (flight below) More evenly blotched, no darker head/forearms or white lower breast; rufous thighs lightly marked; tail evenly barréd; no dark trailing wing-edges.

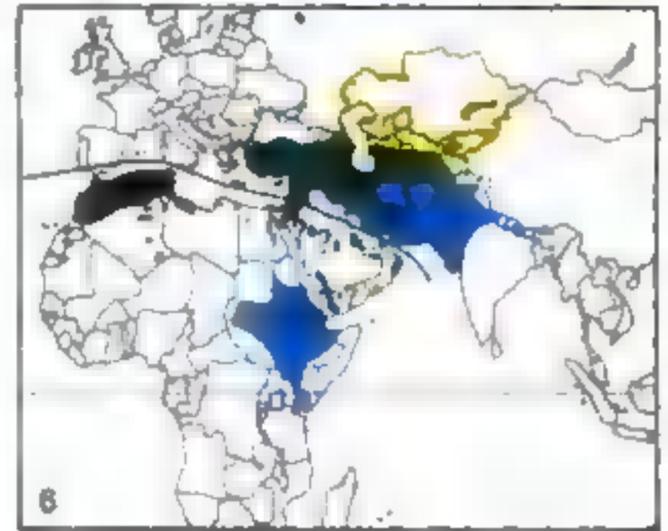


## PLATE 70: LONG-LEGGED AND RED-NECKED BUZZARDS

### 206 Long-legged Buzzard *Buteo rufinus*

Text and map page 696

L45–62 cm (21 in); S112–160 cm (54 in); T19–27 cm (9 in); ♂76%  
 Steppe, semi-desert, open rocky country; also forested hills, mountains, to 3,000+ m (5,000 m on migration). Large eagle-like buteo (but noticeably smaller N Africa); long broad wings (esp. long arms), longish tail; wing-tips short of tail-tip. Slow flexible beats (less stiff than 203); glides on shallow V arms and flat hands; soars on shallow V wings pressed forward, fingers upturned; often hovers. Short mew; not very vocal. Hunts from circling flight or hover, rock/mound perch, or on foot. Mostly solitary, but small flocks on passage. [cf. 203/207/209/etc.]

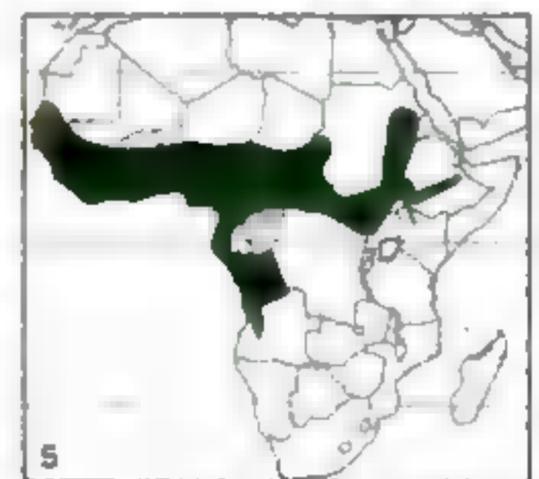


- 206a Pale adult (male) (nominate; SE Europe to C Asia)** Brown above, edged buff; thin-streaked creamy head; whitish-based rufous tail (traces of bars on younger adults); cream below, some streaks, dark flanks/thighs. Flight below (206ax/y: ♂): cream to pale rufous linings, black carpals; white-based primaries/barréd secondaries tipped black; cream tail orange against light. Above (206az: ♂): cream head, buff mantle/forearms; primaries whitish-based but secondaries dark grey; whitish-based rufous tail.
- 206b Rufous adult (male) (nominate)** Darker above, edged rufous; streakier head pale rufous; rufous tail; dark-streaked rufous below, richest on belly/thighs; buff crissum mottled rufous. Flight below (206bx: ♀): rufous linings; dusky carpals; quills as a.
- 206c Dark adult (female) (nominate)** All black-brown; often white nape-patch; grey-brown tail with narrow dusky bars (usually), broad subterminal. Flight below (206cx: ♂): blackish linings as body; remiges much as bx, but rather more barréd secondaries, bolder trailing edges, pale primary-patch; grey-white tail usually dark-barréd, broad subterminal band. Above (206cy: ♂): blackish but for pale windows, plain or dark-barréd grey-brown tail with broad black subterminal band; often white on nape.
- 206d Adult (cirtensis; N Africa)** Flight below. Significantly smaller, with relatively shorter wings (largest ♀s mostly smaller than smallest nominate ♂s); varies exactly as a/b in colour, but no dark morph like c; greater risk of confusion with 203d.
- 206e Pale rufous juvenile (female) (nominate)** Varies much as a/b, if rather more streaked below, but grey-brown tail closely barréd. Flight below (206ex: rufous ♂): less clear-cut dark trailing edges to wings (difference not so marked as in 203g); barréd tail. Above (206ey: rufous ♀): differs from a/b mainly in tail.
- 206f Dark juvenile (female)** In flight. Paler/browner than ex; dark trailing wing-edges, striking white primary-bases; more clearly barréd tail with or without obvious broader subterminal (variable: tail sometimes all dark).

### 210 Red-necked Buzzard *Buteo auguralis*

Text and map page 710

L42–50 cm (18 in); S105–127 cm (46 in); T17–21 cm (7 in); ♂82%  
 Broadleaved woodland, plantations, savannah, farmland, forest edge, to 2500 m. Mid-sized buteo; broad wings, medium tail; wing-tips short of tail-tip. Unobtrusive, but soars noisily in display: mewing scream *peee-ah*. Solitary; sometimes small parties on southward passage. Mainly still-hunts. [cf. 203d/204/206]



- 210a Adult** Black-streaked rufous head/mantle; dark back edged paler; rufous tail, black subterminal; white-streaked dark throat, brown chest; white abdomen, breast/flanks blotched blackish. Flight below (210ax): white with brown chest, rufous tail; dark spots on belly/linings, grey carpal arcs, black trailing edges. Above (210ay): rufous head/mantle, redder tail with subterminal bar; obviously grey remiges barréd/tipped black.
- 210b Juvenile** Brown above, edged rufous; barréd tail tinged rufous; cream chest/flanks dark-blotched. Flight below (210bx): less marked than ax, paler head; secondaries with faint bars and tips; barréd tail. Above (210by): rufous tone; tail barréd.



## PLATE 71: AFROTROPICAL BUZZARDS

### 204 Mountain Buzzard *Buteo oreophilus*

L:41–48 cm (18 in): S:102–117 cm (43 in): T:17–19 cm (7 in): ♂91%

Mountain forest in E, 2,200–3,800 m (4,500 m); lowland forest and pine plantations in S, to 1,500 m. Slightly smaller than **203d**, with thinner wings/tail, shorter legs; wing-tips short of tail-tip [shorter than shown here]. Beats more flexible; soars on flatter wings. Mostly still-hunts. Shrill high *peep-oo*. Solitary. **a**, **c** and **b**, **d** may be distinct species; once treated as races of **203**. [cf. migrants of **203d**, Sep–Apr, usually silent; **ac**206]

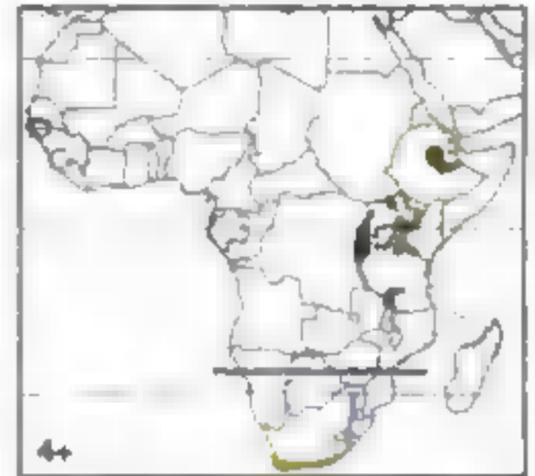
**204a Adult (female)** (nominate; E. Africa) Brown above; thin tail-bars, wider subterminal; brown-blotched whitish below; brown/rufous-banded thighs; eyes brown. Flight below (**204ax**: ♂): blotched body; darker thighs/patagia/carpal patches, mid-wing panels mottled white; white-based primaries, barred secondaries, wide dark trailing edges; barred greyish tail and broader subterminal. Above (**204ay**: ♂): quills barred; small pale primary-windows.

**204b Adult (female)** (*trizonatus*; S. Africa) Broader rufous edges above; more rufous tail; usually white breast-band. Flight below (**204bx**: ♂): pale breast-band/mid-wing panels; tail often paler-based.

**204c Juvenile (male)** (nominate) As **a** but more edged rufous above, streakier below; eyes yellowish. Flight below (**204cx**: ♀): more lightly marked; narrower trailing edges; no subterminal tail-band.

**204d Juvenile (female)** (*trizonatus*) Flight below. Differs from **b** much as **c** differs from **a**.

Text and map page 693



### 211 Jackal Buzzard *Buteo rufofuscus*

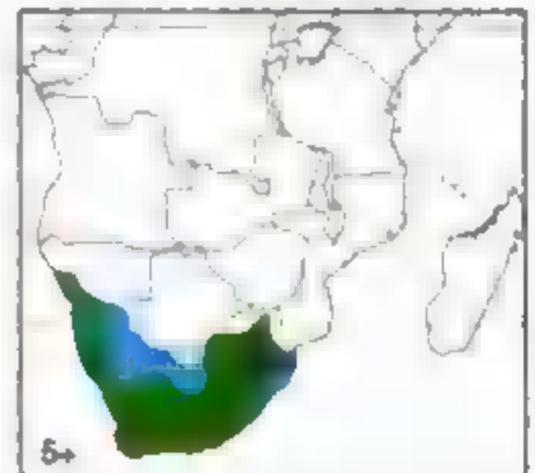
L:46–55 cm (20 in): S:127–145 cm (53 in): T:18–22 cm (8 in): ♂79%

Hills, mountains, especially montane grassland, to 3,500 m; coastal Namibia. Shape/behaviour much as **212** and formerly treated as conspecific, but ranges overlap in W. Namibia. [cf. **212** in north/73]

**211a Adult (female)** Like **212a** above, including rufous tail (usually subterminal band if subadult), but sometimes mostly white; throat black; ragged white line above rufous chest; black abdomen with white bars; sometimes throat/chest whitish (pale morph); rarely all blackish-brown below (dark morph). Flight below (**211ax**: ♂): quills much as **212ax**/**bx** (secondaries less barred), but linings almost always blackish and abdomen barred. Above (**211ay**: ♂): black (occasionally mostly white); barred greyish remiges, rufous tail.

**211b Juvenile (male)** Paler crown than **212d**, washed rufous; mottled rufous above, secondaries paler; white to pale rufous below, richest on sides, usually some dark streaking. Flight below (**211bx**: ♀): pale rufous body/linings; carpals/tail-bars less clear than **212dx**.

Text and map page 712



### 212 Augur Buzzard *Buteo augur*

L:48–57 cm (21 in): S:120–149 cm (53 in): T:20–25 cm (8 in): ♂77%

Open uplands/rocky outcrops, to 5,000+ m; desert in Namibia. Large thick-set buteo; long broad wings, short tail; wing-tips exceed tail-tip. **c**/**e** may be a distinct species. Flexible beats; glides rocking in V; soars with less V; hovers. [cf. **211** in south; **b**73; **b** and dark morph of **d** from **206cf** mainly by shape]

**212a Pale adult (female)** (nominate; E./SW Africa) Slate-black above, whitish flecks, barred secondaries; rufous tail (subterminal band may be subad); white below (if throat white, too, probably ♂). Flight below (**212ax**: ♂): white but for black carpal arcs and wing-tips/trailing edges, barred secondaries, rufous tail.

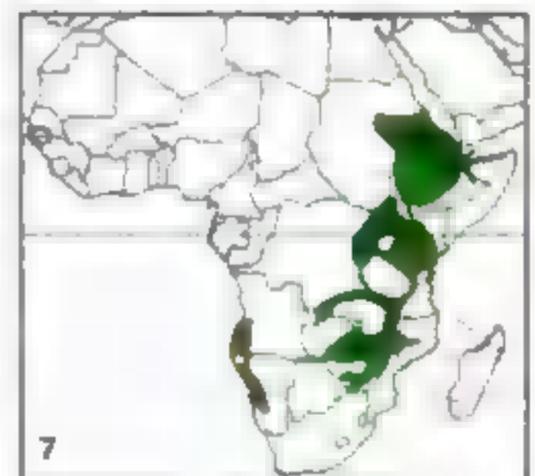
**212b Dark adult (female)** (nominate; up to c50% in Ethiopia, rare in S range) Black but for barred remiges, rufous tail. Flight below (**212bx**: ♂): all black with rufous tail, remiges as **a**.

**212c Adult (female)** (*archeri*; N. Somalia) Back mottled/blotched rufous; all rufous below, but whitish throat marked with black, black chest-sides. Flight below (**212cx**: ♂): rufous body/linings/tail; remiges as **ax**/**bx**, but secondaries washed rufous.

**212d Juvenile (male)** (nominate) Brown above, edged buff; tail close-banded; buff below, some streaks on throat/breast-sides. Flight below (**212dx**: ♀): buff body/linings, barred secondaries/tail (cf **a**).

**212e Juvenile (female)** (*archeri*) Flight below. Body/linings pale rufous, very like **211bx** but with fewer markings; tail obscurely barred, too.

Text and map page 713





204a



204b



204c



204d



204a



204c



204b



204a



211a



211a



211a



211b



212b



211b



212a



212a



212b



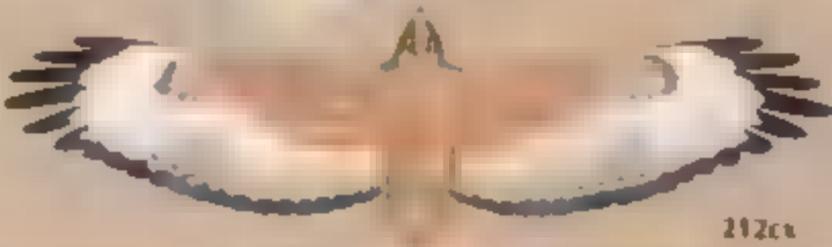
212c



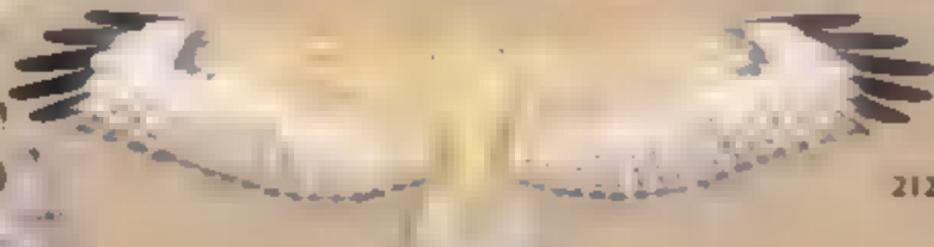
212c



212d



212c



212e

## PLATE 72: LARGE NEOTROPICAL EAGLES

### 213 Crested Eagle *Morphnus guianensis*

L79–89 cm (31 in): S138–154 cm (57 in): T34–43 cm (15 in): ♂88%

Lowland forest, to 600 m (1,200 m). Large slender eagle; broad rounded wings, long tail, pointed erectile crest, bare legs. Sits in tall trees; soars high. Solitary. [cf. 214; cd245b/247b]

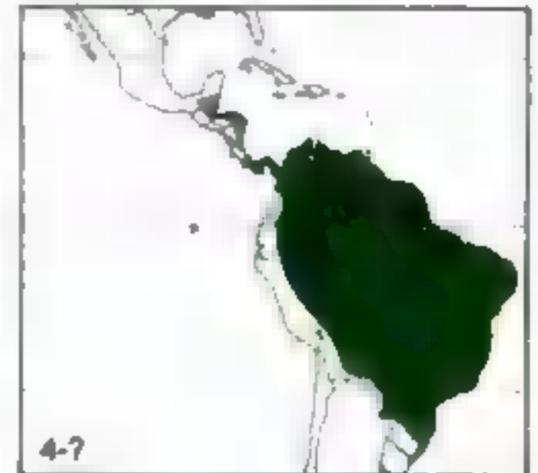
**213a Pale adult (male)** Pale brown-grey head/chest, pale-tipped black crest; bare slaty mask; cere; blackish above, coverts and rump edged white; tail black with 3 mottled grey bands; abdomen creamy, sometimes line brown or rufous bars. Flight below (**213ax**; ♀): cream but for grey chest-band, dark bands on grey quills (hindmost broadest in each case).

**213b Dark adult (female)** Head/neck/chest dark grey, throat paler; black bars below (sometimes much reduced). Flight below (**213bx**; ♂): dark chest, barred abdomen/linings. Extreme morph (**213by**): almost all blackish (some white tips) but for banded quills.

**213c Pale juvenile (male)** Head/underbody all whitish but for mask and some black on crest; sandy-grey above, mottled blackish and white; 7–8 thin tail-bars. Flight below (**213cx**; ♂): white body/linings; barred quills.

**213d Dark third-year (female)** Flight below. Grey chest mottled brown (later black, tipped grey), irregular dark bars elsewhere. [Dark brown above, mottled white; head sandy-grey, crest spotted.]

Text and map page 715



### 214 Harpy Eagle *Harpia harpyja*

L89–102 cm (38 in): S176–201 cm (74 in): T37–42 cm (16 in): ♂85%

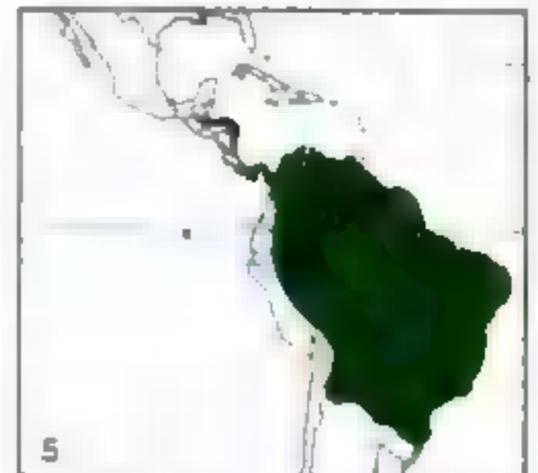
Lowland forest, to 900 m (2,000 m). Huge eagle; broad rounded wings, long broad tail, two-pointed crest, massive bare legs. Mostly stays within canopy; seldom soars(?). Hunts arboreal mammals by fast twists/glides among branches. Wailed *whewoooo*. [cf. 213]

**214a Adult (male)** Grey head, double blackish crest; black above, thinly edged whitish; 3 greyish tail-bands; white below with black chest, barred thighs; cere black. Crest erectile (**214ax**). Taking squirrel monkey *Saimiri sciurea* (**214ay**). Flight below (**214az**; ♀): white with grey head; black chest, axillaries and irregular bands on linings; banded tail, more barred remiges.

**214b Juvenile (female)** Brown-grey above, marbled blackish; white head and underparts (bushier crest soon dark); several thin tail-bars.

**214c Second/third-year (male)** Flight below. Still whiter than **ax**; throat/chest pale grey, later chest mottled; thighs and linings obscurely barred; tail with 3–4 thin bands, slightly wider subterminal.

Text and map page 717



### 247 Isidor's Eagle *Oroaetus isidori*

L63–74 cm (27 in): S1447–166 cm (62 in): T27–34 cm (12 in): ♂79%

Mountain forest, 600–3,400 m (nesting 1,800–2,500 m). Sturdy eagle; broad wings, longish tail, feathered legs; pointed crest usually raised. Heavy flight; soars high. [cf. b244c/245bc/213c/182b/183b]

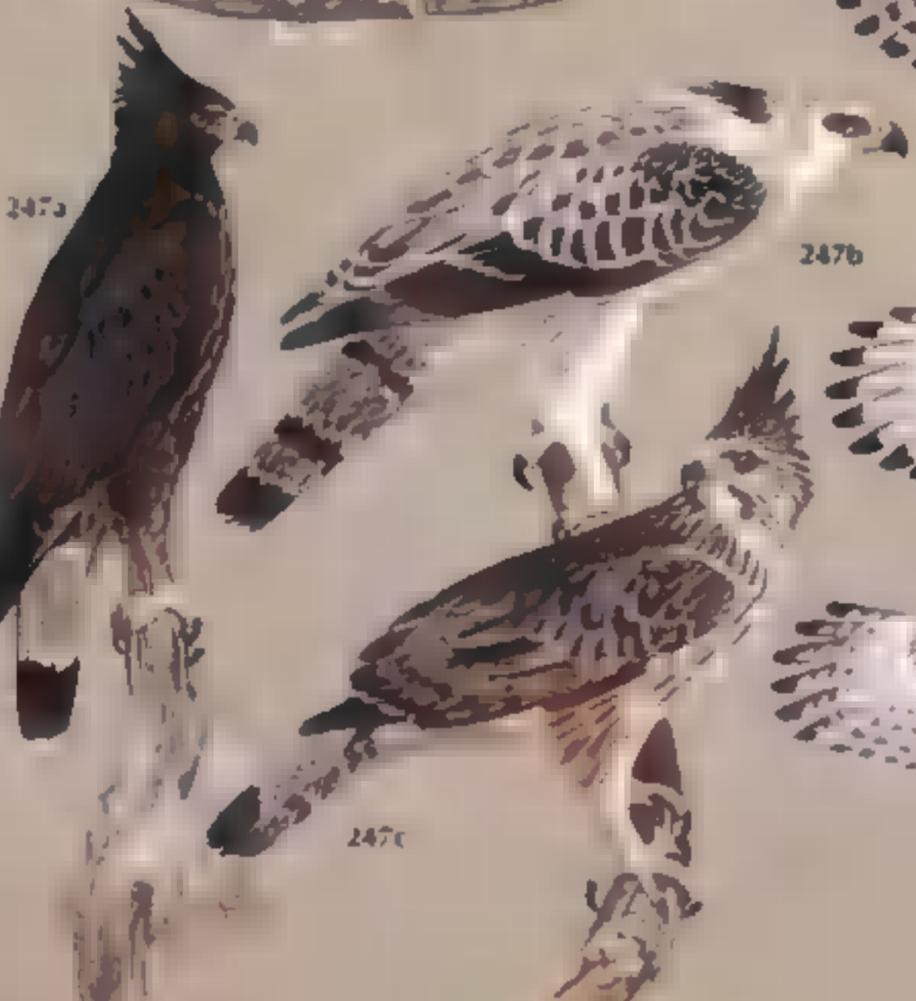
**247a Adult (male)** Glossy black head/back; black-tipped grey primaries; pale greyish tail, broad subterminal band; chestnut below, thinly black-streaked; thighs black. Flight below (**247ax**; ♀): black head, chestnut body/linings, two-tone tail; pale primary-windows, darker secondaries with broad dark trailing edges.

**247b Juvenile (female)** Creamy head, crown/crest dark-streaked; grey-brown above, edged buff; tail mottled whitish, with 2–3 dark bars, broader subterminal; whitish below, few dusky/rufous streaks on breast/flanks. Flight below (**247bx**; ♂): whitish body/linings, some streaks; pale windows, darker secondaries, barred tail.

**247c Third/fourth year (male)** More or less blackish above, buff-streaked on head/crest, grey-black wings edged whitish; tail more as **a**; whitish below, variably mixed with rufous, somewhat streaked.

Text and map page 790





## PLATE 73: NEOTROPICAL HAWK EAGLES

### 234 Black-and-white Hawk Eagle *Spizastur melanoleucus*

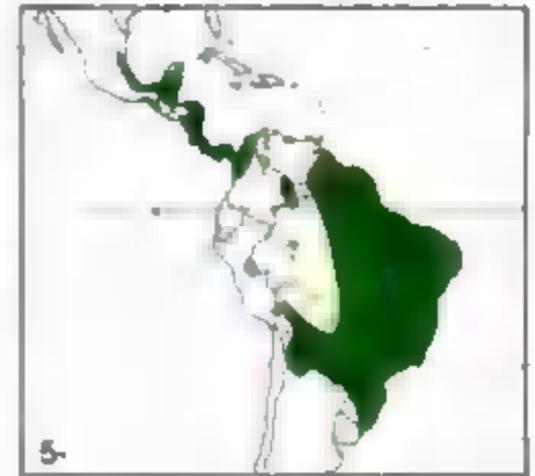
L51–61 cm (22 in); S110–135 cm (48 in); T23–25 cm (9 in); ♂70%

Wet forest, forest openings/edges, to 1,700 m (wanders to 3,000 m). Small-ish chunky buteo-sized eagle; longish rounded wings, longish tail, short bushy crest, feathered legs; wing-tips half down tail. Shrill *kree-ooow*. Soars; perches openly; but scarce. [cf. 245b/14b]

**234a Adult (male)** All-white head, underbody but for small black mask and skullcap; black back, shoulders, browner wings; greyish tail, 3–4 black bands, subterminal wider; cere red-orange. Flight below (**234ax**: ♀): neatly all white; black-tipped primaries, lightly barred secondaries, banded tail. Above (**234ay**): black but for white head with black skull cap, grey and black tail.

**234b Juvenile (female)** Much as a, but less compact skullcap, browner back, white-edged shoulders, thinner distal tail-band. Flight below (**234bx**: ♂): as ax, but more pointed primaries clearer-banded.

Text and map page 767



### 244 Black Hawk Eagle *Spizaetus tyrannus*

L58–71 cm (25 in); S115–148 cm (52 in); T29–39 cm (13 in); ♂87%

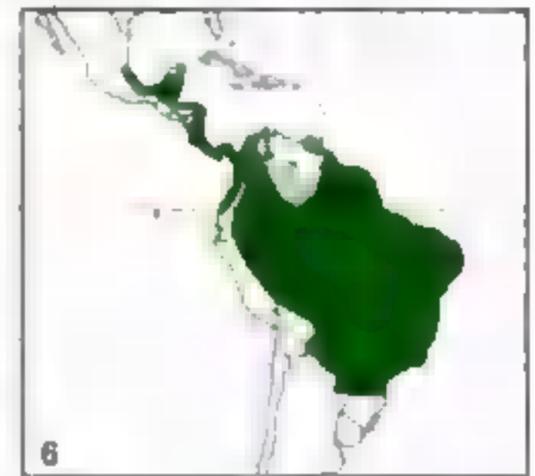
Forest, secondary woodland, mainly below 1,500 m but locally to 3,000 m. Slim mid-sized eagle; broad wings narrowed at bases, long squared, slightly rounded tail, short wide crest, feathered legs; wing-tips just exceed tail-base. Soars high on flat wings held forward, tail almost shut. Perches in canopy, seldom seen; mostly still-hunts. Noisy: *whit, whit-whit wheeet*, last note downslurred. [cf. c245]

**244a Adult (female)** (nominate; E./S Brazil) Black but for white-based crest, lightly white-banded thighs/crissum; throat, belly may also be white-flecked; 3 wide grey tail-bands; thin tip; cere slaty.

**244b Adult (male)** (vsus rest of range) More and clearer white bars on thighs/crissum, often streaks/spots on throat, belly. Flight below (**244bx**: ♀): black breast, white-spotted linings (both races) and abdomen; bold bands on quills, rearmost widest.

**244c First/second-year (female)** Browner above, edged whitish; mottled whitish head, dusky cheeks; 4–5 thinner tail-bands; streaks on cream breast; dark abdomen mottled/banded white. Flight below (**244cx**: ♂): dark-mottled whitish linings; quills evenly banded (cf. 245ax).

Text and map page 784



### 245 Ornate Hawk Eagle *Spizaetus ornatus*

L56–65 cm (24 in); S107–127 cm (46 in); T23–29 cm (10 in); ♂85%

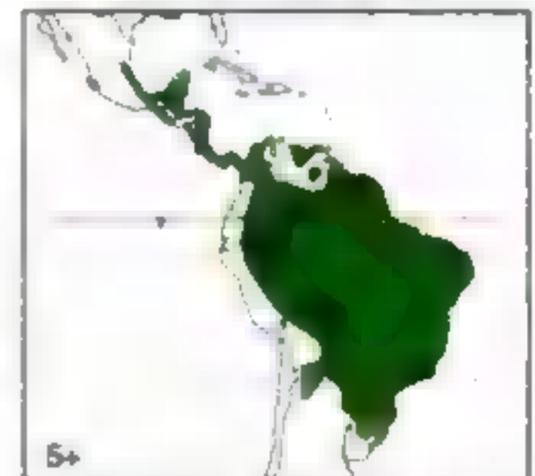
Forest, to 1,500 m (wanders to 3,000 m). Lanky eagle; short rounded wings narrow at base, longish tail, long erectile crest, feathered legs; wing-tips part down tail. Soars, often low, on flat wings held forward. Noisy: *whit, wheeetuu, whep whep, whep whep*, second note downslurred. Mostly still-hunts from hidden perch; swoops; tail-chases. [cf. 108/244c; b234b/15f/247b/213/14b]

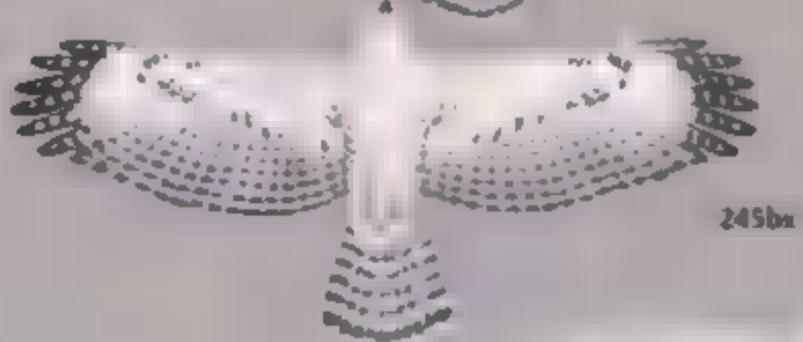
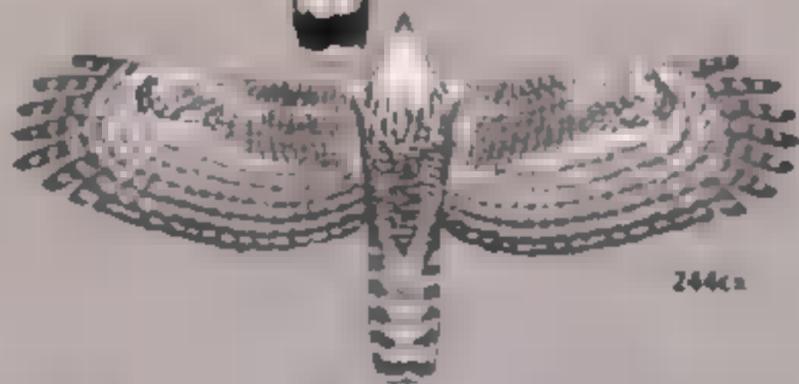
**245a Adult (male)** Black cap, crest, rufous cowl to chest-sides; black above, 3 broad greyish tail-bands; white below, bordered on throat, chest by black moustaches/scattered streaks, boldly barred on abdomen/legs; eyes orange, lores grey. Flight below (**245ax**: ♀): rufous cowl, barred abdomen, broadly banded tail; spotted linings, thinly barred remiges, pale-based primaries.

**245b Juvenile (female)** White head, underparts but for dusky crest, variably black-banded flanks/thighs; brown above, shoulders blackish; 4–5 tail-bars. Flight below (**245bx**: ♂): mostly white; spotted on flanks/greater coverts; barred wing-tips/secondaries/tail.

**245c Second-year (female)** Intermediate, with black and rufous increasing on head, stronger barring on flanks/thighs/legs, blacker mantle; thin tail-bands. Flight below (**245cx**: ♂): more like b.

Text and map page 786





## PLATE 74: LARGE ASIAN AND AUSTRALASIAN EAGLES

### 215 New Guinea Eagle *Harpyopsis novaeguineae*

1.72–90 cm (32 in): S121–157 cm (55 in): T36–44 cm (16 in): ♂64%

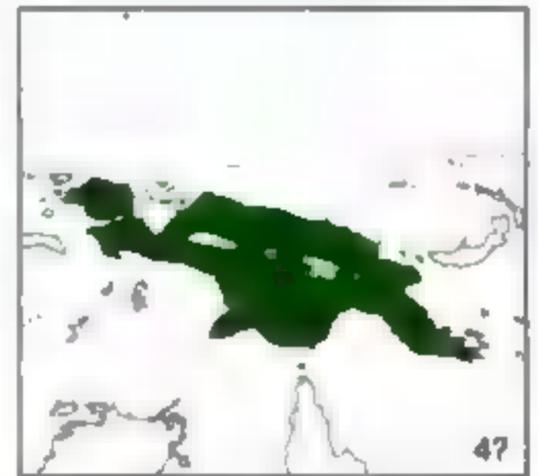
Forest, clearings, nearby savannah or scrub, to 2,000 m (3,200 m). Large eagle: short broad wings, long rounded tail, bare legs, short erectile bushy crest; wing-tips barely cover tail-base. Flies low; seldom, if ever, soars. Perches upright in canopy, tail curving forward; peers down, bobbing head; slips away through trees. Walks parrot-like on branches; lollops on ground with raised wings. Often crepuscular; low staccato *uumpph!*, then occasionally *buk-buk-buk...* [42/223/225 only other eagles, but see 16]

**215a Adult (male)** Grey-brown above, barred darker and edged cream; 4–5 blackish tail-bars and broad subterminal band; creamy below, throat/chest variably tinged grey and flanks flecked brown. Flight below (**215ax**; ♀): creamy, head darker; bold bars on greyish quills, broad subterminal.

Swooping, like huge accipiter, on Papuan lesser forest wallaby *Dorcopsulus macleayi* (**215ay**).

**215b Juvenile (female)** As a, but paler above, plainer and more buff below; 7–8 thin tail-bars, no subterminal. Flight below (**215bx**; ♂): uniform creamy-buff; thinly barred tail and distal remiges.

Text and map page 720



### 216 Philippine Eagle *Pithecophaga jefferyi*

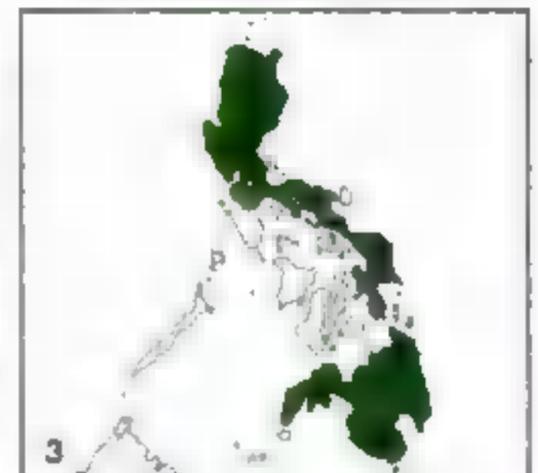
1.90–100 cm (37 in): S184–202 cm (76 in): T42–46 cm (17 in): ♂90%?

Forest, 150–1,800 m (2,000 m?). Huge eagle; short broad round wings, long squarish tail, very deep narrow arched bill, bushy erectile crest, bare legs, huge feet; wing-tips part down tail. Flaps and glides like enormous accipiter; soars in display. Endangered. [cf. 241b]

**216a Adult (male)** Dusky-streaked creamy head; brown above, edged cream; tail obscurely dark-banded with broader subterminal and white shafts; white below, streaked rufous on throat-sides, thighs; eyes blue-grey, cere green-grey. Flight below (**216ax**): mainly white; obscure dark subterminal bands on silvery secondaries and otherwise plain tail; slight streaks on thighs, forearms.

**216b Juvenile (female)** Similar to a; eyes brownish; wing subterminals fainter; tail-end almost plain. Catching Philippine flying lemur *Cynocephalus volans* (**216bx**).

Text and map page 721



### 217 Indian Black Eagle *Ictinaetus malayensis*

1.65–80 cm (29 in): S148–182 cm (65 in): T29–38 cm (13 in): ♂83%

Hill forest, scrub, mainly at 500–2,700 m (0–3,000+ m). Largish kite-like eagle; long broad paddle-shaped wings narrow at base, longish rounded tail, feathered legs, small bill; wing-tips exceed tail-tip. Slow deep beats; when foraging, glides barrier-like in shallow V in open or in trees; circles low in stronger V, long splayed primaries upturned, enabling minimal speeds while checking canopy for nests. Feeds on eggs/nestlings. [cf. 218–221/224/237d]

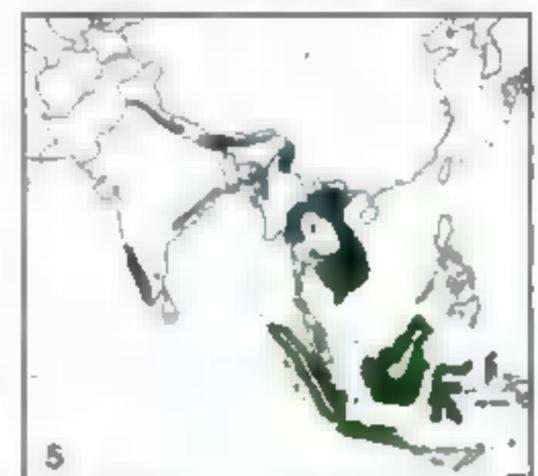
**217a Adult (male)** (nominate; SE Asia/Moluccas) All blackish-brown but for variable whitish on rump and around eyes/bill, faint greyish barring on tail. Flight below (**217ax**; ♂): black with faint grey barring on both tail and remiges, small white patch at base of outer primaries. Clambering down branch towards nest of Black Drongo *Dicrurus nactus* as owner swoops (**217ay**).

**217b Adult (female)** (*peringer*; India/Sri Lanka) Larger (but note a is ♂).

**217c Juvenile (male)** (*peringer*) Dark brown above, speckled buff; barred rump, obscurely barred tail; tawny-buff head/underbody all streaked blackish except face. Flight below (**217cx**; ♀): plain head; streaked breast; wing-linings paler than darkly barred remiges; tail.

**217d Second-year (male)** Flight below. Acquires adult plumage quicker than other eagles; intermediate stage dark brown, paler-headed, streaked below.

Text and map page 722



215a



215b



215a1

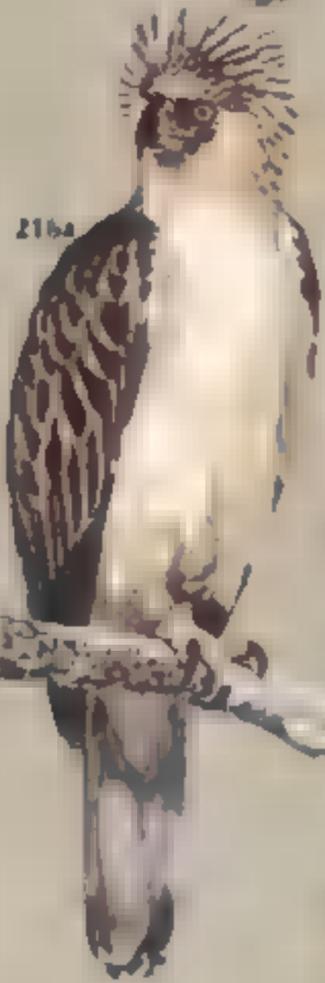


215b1

215a2



216a



216b



216a1



216b1

217a2



217b



217a



217a1



217a2



217b1

217c



## PLATE 75: INDOMALAYAN HAWK EAGLES I

### 238 Mountain Hawk Eagle *Spizaetus nipalensis*

L66–84 cm (30 in): S134–175 cm (61 in): T26–39 cm (13 in): ♂86%

High forest, at 600–2,800 m in Himalayas, to 4,000+ m in China, but to only 1,500 m in S India and at 250–1,500 m in Japan. Largish slim eagle; short rounded wings, longish rounded tail, feathered legs; long crest (not c); wing-tips barely exceed tail-base. Glides, soars in shallow V. Noisy: sharp *kek-kutik*. Hunts from flight or perch. c possibly distinct species. [cf. 237; 242/243/11/19]

**238a Adult (male)** (nominate; mainland/Taiwan) Brown above; black crown and buff-tipped crest, pale midwing-coverts, light-banded rump; tail obscurely banded; streaky cheeks, black moustaches and throat-stripe; rusty chest with dark streaks/broken white bars; white abdomen barred brown; cere blackish. Flight below (**238ax**: ♀): rusty linings all heavily streaked, barred; barred remiges; 2–3 bands and broader subterminal on whitish tail.

**238b Adult (female)** (*kelaarti*; SW India/Sri Lanka) In flight. Small; light marks below.

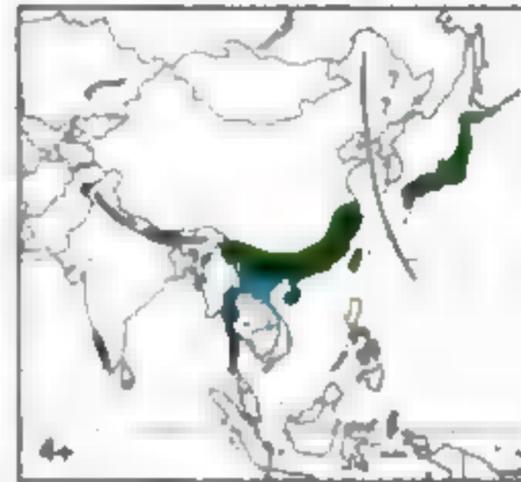
**238c Adult (male)** (*orientalis*; Japan) Much larger (♂ bigger than ♀ a, b); very short crest; generally paler, not heavily marked. Flight below (**238cx**: ♀): buff linings with medium marks (cf. ax/b).

**238d Juvenile (female)** (nominate) Crest as a (cf. 237b); head/underbody variably buff-tinged, head dark-streaked; much as a above, but edged buff; tail barred light/dark brown. Flight below (**238dx**: ♂): creamy; vague carpal arcs, dark wing-tips, barred secondaries; tail as 237gx, but light/dark bars more equal.

**238e Juvenile (female)** (*orientalis*) Much as d but for large size, tiny crest.

**238f Second/third-year (male)** (nominate) Flight below. Bars, streaks and mottles appearing on body, wings and legs; quills may be as d or a.

Text and map page 774



### 242 Blyth's Hawk Eagle *Spizaetus alboniger*

L50–58 cm (21 in): S100–115 cm (42 in): T22–25 cm (9 in): ♂77%

Upland forest, at 500–1,500 m (2,200 m). Smallish slim eagle; proportions as undersized 238. Agile; hunts accipiter-like through trees; soars less. Screaming *yhu yhu yip-yip-yip*, 3 last notes higher; less shrill than 237. [cf. 245 especially b; 237/238/19]

**242a Adult (male)** Black above including head/crest; duller wings, grey tail-band; white below, black throat-stripe, streaked breast, barred belly/thighs; cere blackish. Flight below (**242ax**: ♀): linings much as belly, remiges thin-banded; tail-band white.

**242b Juvenile (female)** Tawny head, buff-tipped crest; brown above, edged paler; 4–5 tail-bars; buff below, plain or speckled darker, flanks/crissum often faintly barred. Flight below (**242bx**: ♂): buff; thin dark bars on whitish quills not always very clear.

**242c Second/third-year (female)** Flight below. Buff body/linings variably barred and streaked blackish; tail and remiges already much as a.

Text and map page 781



### 243 Wallace's Hawk Eagle *Spizaetus nanus*

L45–49 cm (19 in): S95–105 cm (39 in): T22–24 cm (9 in): ♂88%

Lowland forest, to 500 m, irregularly 1,000 m. Slim eagle; even smaller than 242 (with which long confused), but relatively longer wings/tail.

**243a Adult (male)** (nominate; whole range bar c) Black-brown above, edged paler; rufous-buff head heavily dark-streaked, buff-tipped black crest; 3 black bands on greyish tail; creamy below with dusky median throat-stripe/breast-streaks, browner bars on abdomen/legs; cere blackish. Flight below (**243ax**: ♀): like older 242c, but rufous-buff wing-linings lightly spotted, 3 tail-bands more equal.

**243b Juvenile (female)** (nominate) Like 242b but for smaller feet, less tawny colour; creamier below, palest on throat/legs. Flight below (**243bx**: ♂): tendency to 'honey-buzzard' spacing of tail-bars.

**243c Juvenile (male)** (*strsemanni*; Nias Island) As b, but all head (except black crest) and whole underparts white. [Adult not described.]

Text and map page 783



238a



238c



238at



238ct

238d



238b

238e



238d



238f

242a



242b



242at

243b



243c



242bt



242c

243at



243at

## PLATE 76: INDOMALAYAN HAWK EAGLES II

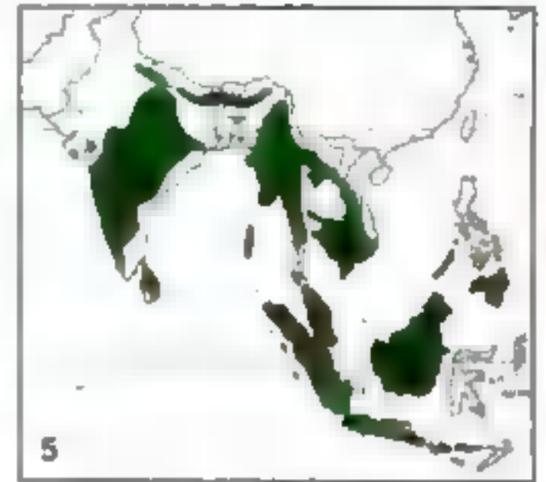
### 237 Changeable Hawk Eagle *Spizaetus cirrhatus*

L51–82 cm (26 in): S100–160 cm (51 in): T22–32 cm (11 in): ♂85%

Savannah woodland/cultivation (esp **a-b**), forest/wetlands (esp. **c-f/h/i**), to 2,200 m. Largish slim eagle, but some island races small; short broad wings, longish tail, feathered legs; **a-b** long crest, **c-f/h/i** almost none (possibly 2 distinct species); wing-tips half down tail. Fast beats; glides/soars on flat or slightly lowered wings, carpals forward. Noisy only near nest. Perches upright in canopy; mainly still-hunts. [cf. 238/239/241–243/11/19/74g; d217/230b]

- 237a Adult (male)** (nominate; peninsular India) Dark-streaked rufous head, buff-tipped black crest; brown above, edged paler; thin dark tail-bands; white throat with black streaks, median stripe, moustaches; white breast boldly dark-streaked; brown abdomen, barred white on thighs/vent; cere green-brown. Flight below (**237ax**: ♀): streaked breast/linings, white-based primaries, barred secondaries; 2–3 thin tail-bars, broader subterminal.
- 237b Adult (female)** (*ceylanensis*; Sri Lanka) Flight below. Clearly smaller; linings less boldly marked; tends to be paler brown above.
- 237c Pale adult (male)** (*limnaetus*; N India to Java/Borneo/Philippines) Vestigial crest; darker above; heavier streaks below. Flight below (**237cx**: ♀): wing-linings paler.
- 237d Dark adult (male)** (*limnaetus*) All blackish-brown, including uppertail (inner half greyer). Flight below (**237dx**: ♀): blackish body/linings; paler remiges black-tipped; broad subterminal on pale grey tail.
- 237e Adult (male)** (*vanheurni*; Simeulue Island) No crest; much smaller.
- 237f Adult (female)** (*floris*; Lesser Sundas) Flight below. No crest; largest race; all white below with slight barring on thighs/wing-linings, barred remiges.
- 237g Juvenile (female)** (nominate) Crest as **a**, but head mainly buff, wings broadly pale-edged; whitish below, variably flecked brown on breast, barred on thighs/crissum. Flight below (**237gx**: ♂): wing-linings lightly marked; 5 tail-bars, wider subterminal.
- 237h Juvenile (female)** (*limnaetus*) No crest; plainer buff head; whiter below with only slight barring on flanks, brownish thighs. Flight below (**237hx**: ♂): body/linings sometimes almost pure white.
- 237i Juvenile (female)** (*andamanensis*; Andamans) Much as **h** (or **c** when adult), but smaller (nearer size of **b**) with short crest; head/underparts very white.

Text and map page 771



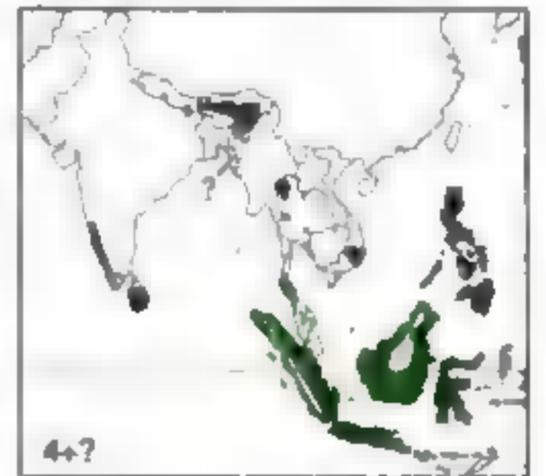
### 233 Rufous-bellied Hawk Eagle *Hieraetus kienerii*

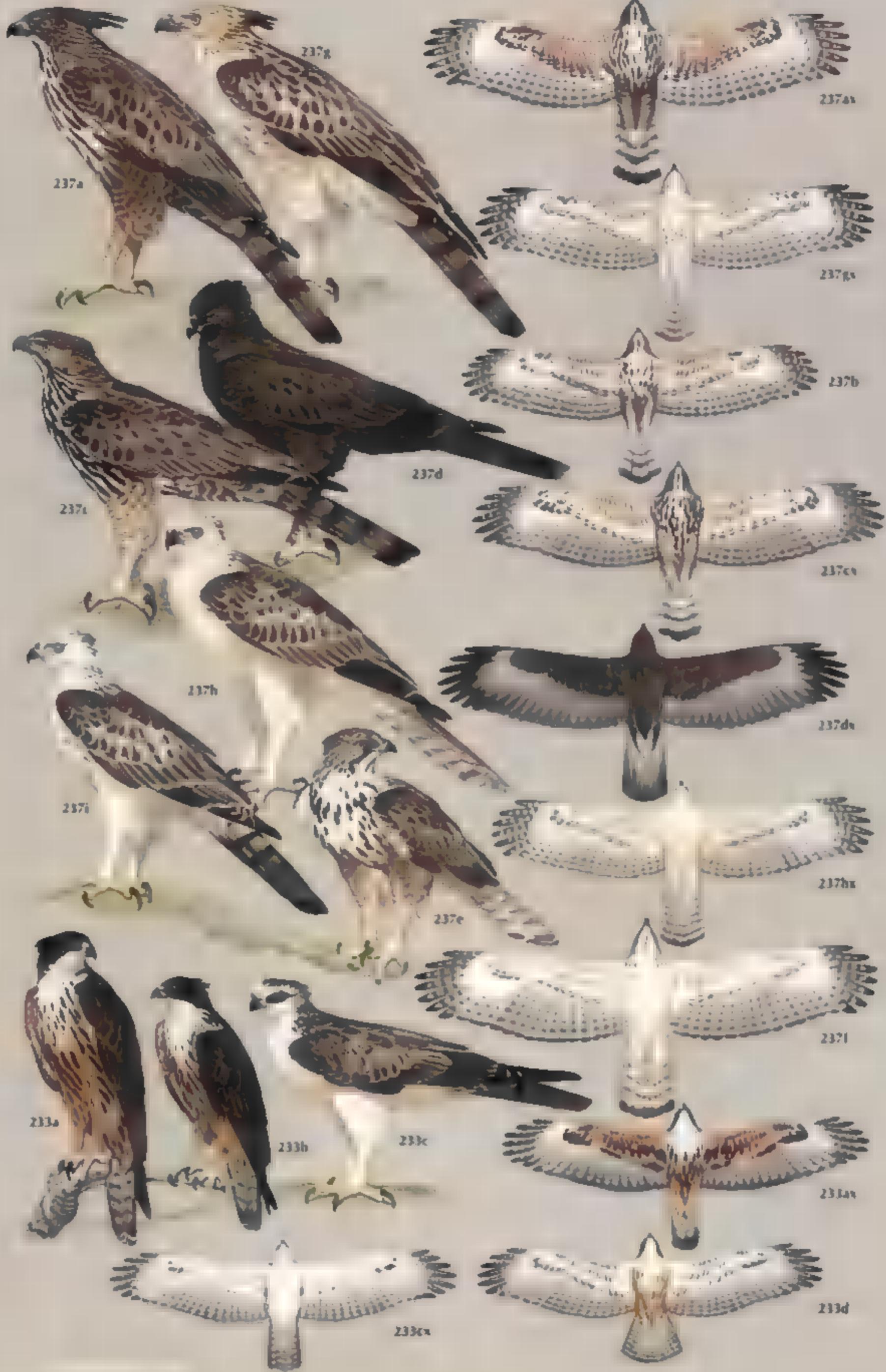
L46–61 cm (21 in): S105–140 cm (48 in): T17–24 cm (8 in): ♂82%

Forest, to 2000 m, but at 200–300 m in Nepal. Small slim eagle; longish pointed wings, longish tail, feathered legs, short crest; falcon-like look with black cheeks, colours of **297**; wing-tips well down tail. Fast deep beats; glides/soars on flat wings pressed forward. Hunts by stoop in flight or from hidden perch in canopy. [c237gh]

- 233a Adult (male)** (nominate; mainland/Sri Lanka/Hainan) Mostly jet-black above, head/crest glossiest; browner greater coverts/remiges; barred tail; largely rufous below, but for white throat/chest, and streaked black. Flight below (**233ax**: ♀): wing-linings also rufous, mottled black; barred remiges rather dark, but large whitish patch at base of primaries [shows pale brown above, too]; greyish tail with 3–4 bars, broader subterminal band.
- 233b Adult (male)** (*formosus*; Greater Sundas to Philippines) Far smaller; all black above.
- 233c Juvenile (female)** (nominate) Brown above, edged paler; white on forehead extends back over dark eye-patches, whitish cheeks streaked tawny; grey-brown tail barred black; white below. Flight below (**233cx**: ♂): largely white linings; pale grey quills finely barred, patch at base of primaries as **a**.
- 233d Second/third-year (male)** (nominate) Flight below. Still white below, with some black streaks/mottling, but black hood already shows.

Text and map page 765





## PLATE 77: INDONESIAN AND PHILIPPINE HAWK EAGLES

### 239 Javan Hawk Eagle *Spizaetus bartelsi*

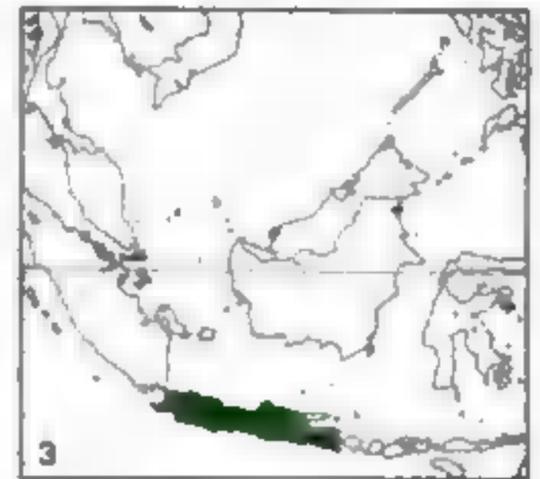
L56–60 cm (23 in): S110–130 cm (47 in): T24–26 cm (10 in): ♂85%?

Mountain forest, mostly at 500–2,000 m (0–3,000 m). Smallish slim eagle; short rounded wings, longish rounded tail, feathered legs, long erectile crest; wing-tips cover tail-base. Rare. [cf. 237c/19/233]

**239a Adult (male)** Dark brown above; white-tipped black crest, rufous cheeks/nape; grey-brown tail banded black; white to whitish-buff below, black moustaches/throat-stripe, breast with blackish drops, belly/thighs/crissum dark-banded; cere blackish. Larger adult ♂ (**239ax**). Flight below (**239ay**; ♀): rusty-buff linings flecked/bordered blackish, pale grey/whitish remiges barred [usually fewer and broader bars than shown]; 2–3 dark bands on greyish tail, blacker subterminal.

**239b Second-year (female)** Dark brown above, edged whitish; pale buff to dirty white head/underbody, blackish flecks on crown, crest as a; 5 thin black tail-bars. Flight below (**239bx**; ♂): buffish with dark-ended greyer primaries, barred secondaries, several tail-bars [plate misleading: secondaries with fewer bars, tail actually more as ay].

Text and map page 776



### 240 Sulawesi Hawk Eagle *Spizaetus lanceolatus*

L55–64 cm (23 in): S110–135 cm (48 in): T23–28 cm (10 in): ♂70%

Mountain forest, at 250–1,500+ m (2,000 m). Smallish/mid-sized eagle; proportions much as 239 (or small 238), but very short crest (as many 237). [cf. 20/233/237/230]

**240a Adult (male)** Blackish above; grey tail with 3–4 blackish bands; rufous of streaky cheeks extends into obscure collar, black moustaches/stripe on white throat; rufous breast streaked black; white abdomen barred dark brown; cere black. Flight below (**240ax**; ♀): linings barred as belly; greyish remiges, white-based primaries; 3 blackish tail-bands unevenly spaced.

**240b Juvenile (female)** Dark brown above, whitish bases showing through; grey-brown tail with 5–6 blackish bars; white head/underbody, some times with obscure brown streaks on crown/breast, bars on flanks. Flight below (**240bx**; ♂): largely white, including linings and bases of primaries, but thin dark bars on quills.

**240c Second/third year (male)** Flight below. Barring appearing on abdomen and wing-linings, but all still pale; tail here mixture of a/b.

Text and map page 778



### 241 Philippine Hawk Eagle *Spizaetus philippensis*

L56–67 cm (24 in): S105–125 cm (45 in): T26–29 cm (11 in): ♂71%

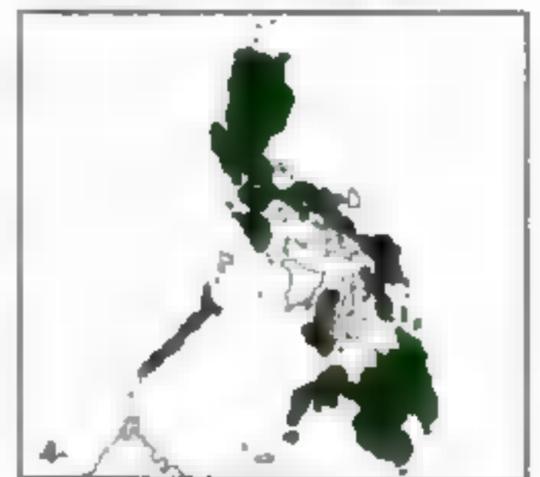
High open forest, to 1,900 m (locally 2,500 m). Smallish to mid-sized eagle; shape of genus (see above) and part of 238–242 superspecies; wings relatively even shorter and tail longer. [cf. 20/19/237/b233b (juvenile)]

**241a Adult (male)** (nominate; N Philippines) Dark brown above; head streaked paler, with blackish crest; grey-brown tail barred blackish; black moustaches/stripe on white throat; rufous breast heavily dark-streaked; whitish/rufous thighs barred blackish, legs barred brown; cere dusky. Flight below (**241ax**; ♀): streaky rufous breast, dark belly, barred legs/crissum/linings; barred greyish remiges; 3–4 bands and broader blacker subterminal unevenly spaced on greyish tail. [S race *pinakeri* paler above and below, whitish crown.]

**241b Juvenile (female)** Dark grey-brown above, edged paler and whitish bases showing through; head white, some dark spots; crest as a, but white-tipped; brown tail barred blackish; all white below [thighs lightly barred rusty-buff in S]. (Prey male Philippine Fairy-bluebird *Irena cyanogaster*.) Flight below (**241bx**; ♂): whitish but for dark-tipped primaries, lightly barred secondaries; 5–7 thin tail-bars [more than shown here], sometimes broader subterminal.

**241c Second/third-year (male)** In flight. Streaky breast, browner belly/linings; first bars on mid-wings/legs/vent; quills already much as a.

Text and map page 779





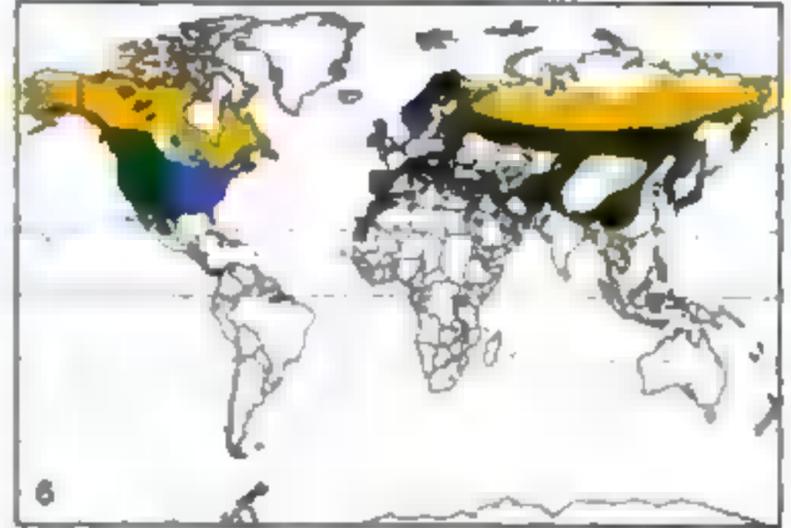
## PLATE 79: LARGE PALEARCTIC (AND NEARCTIC) EAGLES

### 224 Golden Eagle *Aquila chrysaetos*

Text and map page 742

L66–90 cm (31 in): S180–234 cm (81 in): T28–38 cm (13 in): ♂81%

Mountains, rocky hills, sea-cliffs, desert bluffs, forest, to 5,500 m. Large eagle (but much size variation over wide range); long broad wings, bulging secondaries, narrower hands/base; longish rounded tail, protruding head; baggy feathered legs; wings reach tail-tip. Slow deep beats; glides on flat wings, or sometimes V arms, level hands, upswept fingers; soars in shallow V, sometimes flat. Hunts by low flight, short pounce; or will stoop from height. Solitary. [cf. Pal 222/Nea 47b/c209]



**224a Adult (male)** (nominate; W Eurasia) Dark brown (often mottled by new and old feather mix); golden-buff to rufous-tawny crown/nape; tawny to greyish band on wings; slightly paler grey-brown tail obscurely barred and dark-tipped; thighs paler, legs more so. Flight below (**224ax**: ♀): slightly paler bases to quills. Above (**224ay**: ♂): tawny crown/nape, midwing-bands.

**224b Adult (male)** (*canadensis*; N America/NE Asia) Blacker; often also brighter rufous nape (varies dull yellowish to orange-brown).

**224c Juvenile (female)** Duller browner crown/nape, no wing-bands; whitish bases show through as body mottling; white tail-base; whitish to pale rufous trousers, crissum. Flight below (**224cx**: ♂): white tail-base and variably extensive wing-patches. Above (**224cy**: ♀): tail-base more obvious, but wing-patches smaller.

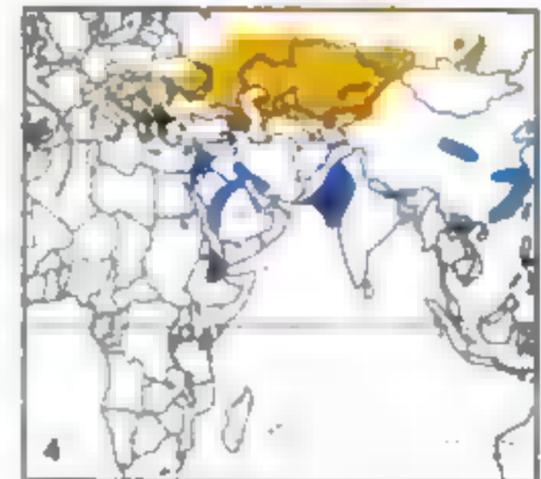
**224d Fourth-year (male)** Flight below. Resembles c, but wing-patches much smaller, tail-base less clear. Above (**224dx**: ♀): more as ay, with pale crown, tawny midwing-band, little or no white on remiges; tail mix of dark and light feathers. [Not full adult until 9-yr, but difficult to separate after 3-yr, and even to age in 2/3-yr because amount of white on quills varies.]

### 222 Imperial Eagle *Aquila heliaca*

Text and map page 737

L68–84 cm (30 in): S176–216 cm (77 in): T26–39 cm (12 in): ♂83%

Open timbered lowlands, steppe, marshland; forested uplands where **224** absent, to 1,800 m (to 3,900 m on migration). Large robust eagle; long wings relatively narrow, often parallel-edged (juvenile secondaries more bulging), deep-fingered hands; longish squared tail, prominent head, large bill; baggy feathered legs; wing-tips near tail-tip. Heavy floppy beats; glides/soars on flattish wings, fingers upcurved, tail often closed. Hunts to ground from flight or perch. Usually solitary, even on migration. Spanish form **b**/**d** may arguably be distinct species. [cf. 224/221 especially **e221c**; **d220**/219c]



**222a Adult (male)** (nominate; all but Spain) Black-brown; golden-buff to cream crown/nape, white braces; silvery-grey tail with thin bars, broad subterminal; creamy to pale rusty crissum. Flight below (**222ax**: ♀): blackish body/linings; dark grey remiges and tail-base; rusty-yellow crissum. Above (**222ay**: ♂): whitish nape, braces; two-tone tail; lower back often pale.

**222b Adult (male)** (*adalberti*; Spain) White shoulders (leading edges to coverts in flight), clearer braces, often less buff on head.

**222c Juvenile (female)** (nominate) Tawny-buff, all streaked down to breast. Flight below (**222cx**: ♂): streaked tawny forebody/linings, plain creamy crissum/thighs; plainer greyish greater coverts; pale-tipped blackish quills, wedges on inner primaries. Above (**222cy**: ♀): similar; creamy rump; bold pale tips to dark greater coverts.

**222d Juvenile (female)** (*adalberti*) Strongly tinged rusty, far less streaked; head/underbody often plain with sparse rufous breast-marks.

**222e Fourth-year (male)** (nominate) Flight below. Patchy; still pale crissum, primary-wedges. Above (**222ex**: ♀): obscure pale line on tips of greater coverts, often pale crown/nape. [Adult by c6/7-yr.]



224ay

224bx

224bz

224cx

224d

224cy

222a

222b

224c

222c

222d

224a

224b

222ay

222bx

222cy

222d

222ey

222fx

## PLATE 80: WIDESPREAD OLD WORLD EAGLES I

### 220 Tawny Eagle *Aquila rapax*

L60–72 cm (26 in); S159–183 cm (67 in); T24–30 cm (11 in); ♂89%

Wooded savannah, dry woodland, thornbush, semi-desert, to 3,000 m, in India to only c250 m. Mid-sized eagle; broad wings with somewhat narrower hands; longish tail when fresh; bold head, baggy trousers; short gape (cf 221); wing-tips near tail-tip. Deep beats; soars on flat or slightly raised wings, often more arched in glide. Stoops to ground, strikes prey in air, pirates, still-hunts, scavenges. Solitary, except in thermals or at carrion. Often thought conspecific with 221; differs in structure/eye colour/juvenile plumage. [cf. 221/219/218; Afr also 229; Ind also 217a/fb222c]

**220a Intermediate adult (male)** (nominate; S Africa to Kenya) Dark-streaked tawny to rufous (♀s often heaviest-marked, least on head/abdomen); blackish remiges, faint-barréd tail; all adult 220 eyes yellow.

**220b Pale adult (male)** (nominate) Pale buff to cream (palest when worn), with contrasting dark quills.

**220c Dark adult (male)** (*belisarius*; N Africa to Niger/N Kenya/S Arabia) Dull dark streaky brown, less rufous. Flight below (220cx: ♀): linings dark brown; finely grey-barréd quills also look dark.

**220d Pale adult (female)** (*belisarius*) Dark-streaked buff to whitish, not so pale as b; creamy back/rump. Flight below (220dx: ♀): linings much paler than finely barréd quills; greater coverts darker; paler primary-wedges.

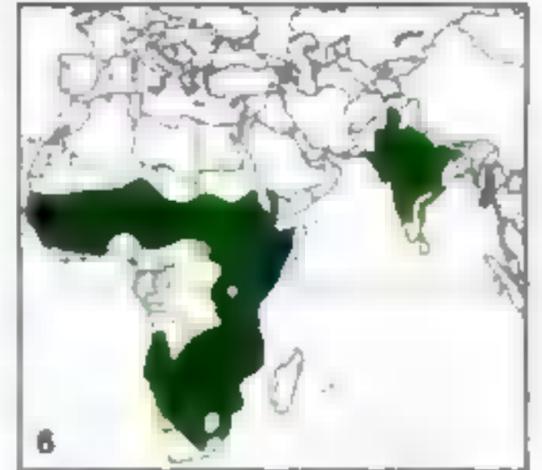
**220e Dark adult (male)** (*vindhiana*; Indian area) Flight above. Dull dark grey-brown, little rufous; head buff-tipped when fresh; tail less barréd; primary-wedges less above on 220 ads than 221.

**220f Pale adult (male)** (*vindhiana*) Flight above. Again greyer tone, head buff-tipped, tail less barréd than d; above as below, coverts much paler than obscurely barréd quills, but greater coverts darker.

**220g Pale juvenile (male)** (*belisarius*) In flight. (220gx: ♂ flight above) Tawny-buff to cream; dark remiges, pale inner primary-wedges and cream trailing edges.

**220h Pale juvenile (female)** (*vindhiana*) Flight above. Darker rufous-buff than g, leaving pale back/rump, more contrasted greater coverts; barréd tail but remiges plain as g (cf. 221d); juv eyes brown.

Text and map page 730



### 221 Steppe Eagle *Aquila nipalensis*

L60–81 cm (28 in); S165–214 cm (75 in); T25–30 cm (10 in); ♂87%

Steppe, semi-desert, open/wooded hills, also grassland in winter, to 3,000 m (4,500+ m, even 7,000 m, on passage). Larger/bulkier (esp. a) than 220, with longer wings, shorter tail, long gape (p.000); longer-necked than 218–219; wing-tips may exceed tail-tip. Heavier beats. More on ground; shambles after prey. Flocks on passage or at food (abundances of termites/locusts/quelea chicks in Afr). [cf. 218–220/222]

**221a Adult (male)** (nominate; C Asia, winters S Asia) Mid to dark brown; usually yellow patch on rear crown/nape; all adult 221 eyes brown.

**221b Adult (male)** (*orientalis*; E Europe/W Asia, winters Africa/SW Asia)

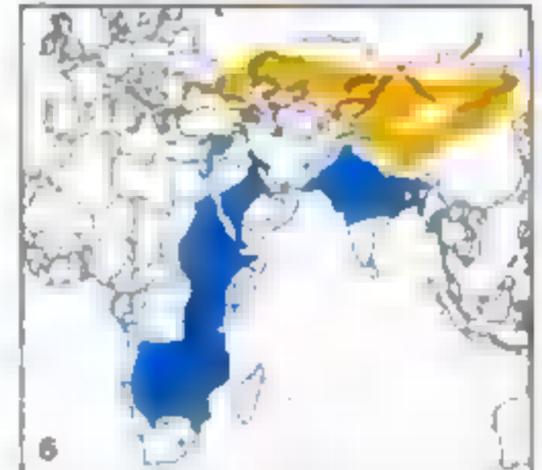
Smaller (but bulkier than 220); less or no nape-patch. Flight below (221bx: ♀): greater coverts grey-brown; linings dark brown as body, or paler/greyer similar in tone to remiges; obscure carpal patches; all quills grey-barréd with dark trailing band; usually pale throat. Above (221by: ♂): dark brown (or forearms greyer, rarely yellow-brown); remiges variably barréd or all dark, pale wedges on inner primaries.

**221c Juvenile (female)** (nominate) Clay-brown to dark brown, usually pale, and variably buff-tipped; generally rufous-buff nape-patch; some birds tawny-buff below; dark brown wings, 3 bold cream bands on tips of coverts and secondaries; pale tip to barréd tail.

**221d Juvenile (female)** (*orientalis*) Smaller; not always nape-patch. Flight below (221dx: ♂): mid-brown to yellowish; paler throat; cream crissum and band along greater coverts; pale primary-wedges; light tips to broad-barréd quills whiten and then abrade. Above (221dy: ♀): white bands on greater and median coverts and on trailing edges of quills; pale primary-wedges [usually more prominent than here], U above tail.

**221e Third/fourth-year (male)** In flight. (221ex: ♂ flight above) Echoes of juvenile: pale bands much thinner (and none on median coverts); body often darker than linings but variable. [Quills untidier than shown; ragged trailing edges.]

Text and map page 733





220a

220b

220dx

220cx

220d

220c

220g

220h

220e

220f

220gx

221dy

221ex

221by

221c

221a

221ba



221dx

221b



221e

221d

## PLATE 81: WIDESPREAD OLD WORLD EAGLES II

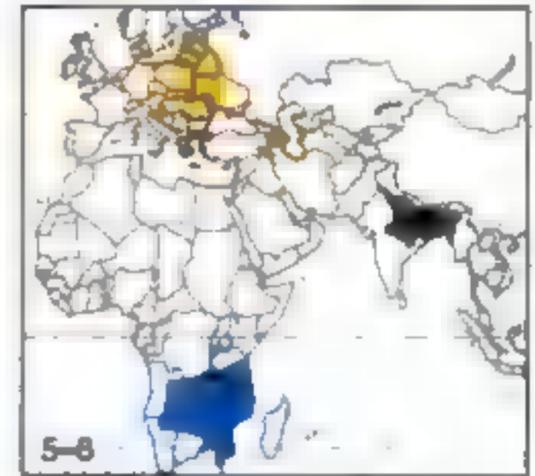
### 218 Lesser Spotted Eagle *Aquila pomarina*

L55–67 cm (24 in): S146–168 cm (62 in): T20–25 cm (9 in): ♂85%

Forest near water, dry mountain woodland, to 1,800 m (2,200 m). Medium eagle; often straighter-edged narrow wings make rounded tail look longer than 219; tight-feathered legs, no bagginess (cf. 220/221); small bill (d bigger); wing-tips near tail-tip. Shallow beats; glides and soars on slightly arched or flatter wings, hands down. Hunts from glide/soar or perch, forages on ground; in India, pirates other raptors. Often solitary; feeding groups, passage flocks. Larger d sometimes thought separate species; adult eyes brown, not yellow; juveniles distinct. [cf. 219/221; Ind also 217]

- 218a Adult (male)** (nominate; Europe, winters Africa) All brown with paler crown/shoulders, blackish quills; eyes yellow. Flight below (218ax: ♀): brown body; linings (greater coverts rarely white-mottled, crissum hardly paler) usually paler than blackish quills; 1–2 pale carpal arcs normally stronger than shown. Above (218ay: ♂): dark with contrasting paler head/forearms; white flash at base of inner primaries; whitish U above tail.
- 218b Pale adult (male)** (nominate) Head/body/coverts mottled or more or less uniform yellow-buff; less pale/far rarer than 219c.
- 218c Juvenile (female)** (nominate) Dark brown with paler shoulders; black greater coverts with whitish tips, smaller on browner medians; pale-tipped blackish quills; rufous-buff nape-patch; cream crissum; eyes brown. [Some juvs more spotted above like d.] Flight below (218cx: ♂): similar to ax, but cream crissum; thin pale tips to quills and greater coverts soon abraded. Above (218cy: ♀): forearms just paler; whitish spots on coverts; pale patch on nape (usually on back, too), U above tail, primary-wedges, but trailing edges to quills soon lost.
- 218d Juvenile (female)** (*hastata*; India) Crown to mantle/scapulars/shoulders often fine-spotted; big round spots on medians; more streaked below than c, paler legs. Flight above (218dx: ♀): fine spots, pale scapulars; U above tail; tail and secondary tips all barred. [Many less spotted, like c.]

Text and map page 724



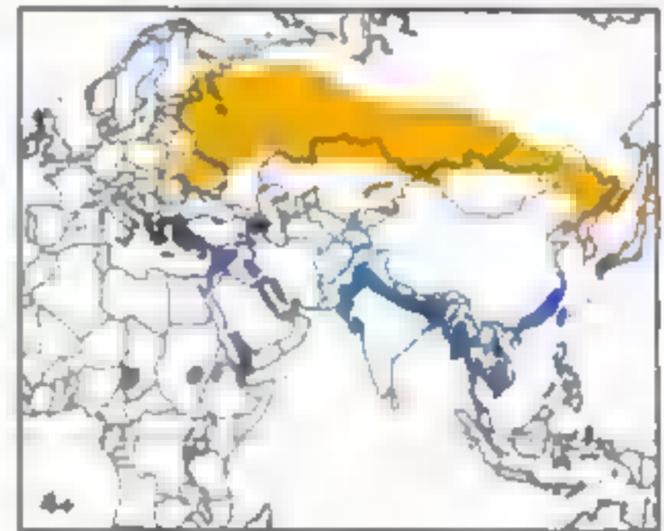
### 219 Greater Spotted Eagle *Aquila clanga*

L59–71 cm (26 in): S157–179 cm (66 in): T23–27 cm (10 in): ♂85%

Marshes with trees, forests near water, to 1,000 m (1,700 m), but to 4,000+ m on passage. Mid-sized compact eagle; straight-edged wings (or secondaries bulging, especially juveniles) broader than 218, so tail looks shorter; slightly bigger bill; again tightly feathered legs; wing-tips near tail-tip. Beats deeper than 218, less heavy than 221; wings often more bowed in gliding. Hunts in flight, from perch, or on ground; pirates other raptors. Settles hunched. Solitary; small parties on migration, groups at food. [cf. 218/220–222; in winter Ind also 217]

- 219a Adult (male)** All dark brown, glossed purple above when fresh; eyes brown. Flight below (219ax: ♀): body/linings darker than quills, or all same tone (rarely, linings slightly paler); single whitish crescent by carpal patches. Above (219ay: ♂): uniformly dark, or shoulders may be slightly paler; faint U above tail; small greyish primary-patches indistinct or invisible.
- 219b Juvenile (female)** Blackish-brown; white-spotted coverts/back, cream-tipped secondaries/tail; below, some buff streaks, creamy crissum. Flight below (219bx: ♂): blackish with paler thinly barred remiges, as ax, but creamy crissum, broad trailing edges, clearer crescents by carpal patches. Above (219by: ♀): white spots on back and coverts, latter in 2–3 almost merging lines; pale primary-patches (primaries white-shafted), creamy trailing edges, U above tail; with wear, spots/trailing edges smaller.
- 219c Pale juvenile (male)** Creamy-buff; quills as b. Flight (219cx: ♀, cy: ♂): pale body/coverts contrast dark quills. [Rare pale adults similar; intermediates include deep tawny morph, both adult and juvenile.]
- 219d Second/third-year (female)** Flight above. Blackish; midwing-line(s), U over tail.

Text and map page 727



218a



218c



218ax



218cx



218cy



218b



218cy



218d



218dx



219ay



219cy



219by



219d



219ax



219a



219c



219cx



219b



219bx



## PLATE 82: AFROTROPICAL EAGLES

### 229 Wahlberg's Eagle *Hieraaetus wahlbergi*

L53–61 cm (22 in): S130–146 cm (54 in): T21–25 cm (9 in): ♂85%

Wooded cultivation, savannah, riverine trees, thornbush, to 2,800 m. Small slender kite-sized eagle; rather long narrow wings, longish squared tail, small pointed face, slight crest (often flat), longish feathered legs, baggy trousers; wing-tips just short of tail-tip. In flight, narrow parallel-edged wings and usually closed longish tail often likened to crossed planks. Fast beats; soars/glides on flat wings, fingers barely separated. Dashes at prey; stoops from height. Sometimes gregarious on migration. [cf. 39/70/218/220/221/230]

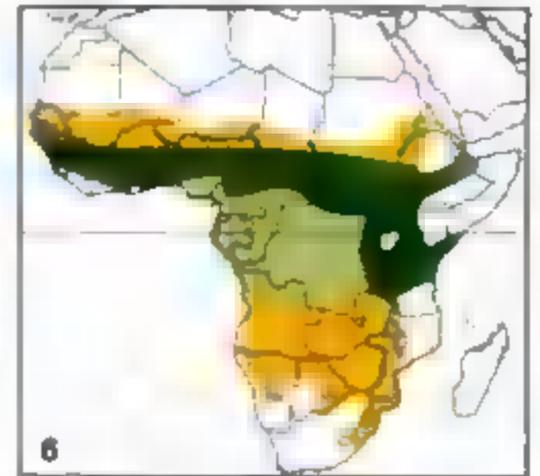
**229a Dark adult (male)** Dark sepia to dark chocolate, with pale-edged wing-coverts, and sometimes paler cheeks or belly; remiges and tail black-brown; eyes brown. Flight below (**229ax**: ♀): body/linings dark; tail, secondaries and more contrasted primaries greyer and obscurely barred. Above (**229ay**: ♂): all dark but for slight pattern on wing-coverts and tertials.

**229b Pale adult (male)** White with cream-edged grey-brown coverts/back, blackish remiges/tail. Flight below (**229bx**: ♂): body/linings white (sometimes, as here, obscure dark marks on axillaries and greater coverts), contrasting with quills as **a** (cf. 230).

**229c Intermediate adult (male)** Varies from pale brown, with or without darker head, to dark brown with pale crown, wholly pale head or also whitish belly; or variably intermediate between these and **a**/**b**. More contrasting remiges/tail/thighs in flight below (**229cx**: ♀); often greyer wing-coverts above (**229cy**: ♂).

**229d Juvenile (female)** Much as **a-c** and equally variable, though head may be more streaked, coverts more broadly pale-edged. Flight above (**229dx**: ♀): as **a-c** but with creamy trailing edges to quills.

Text and map page 755



### 226 Verreaux's Eagle *Aquila verreauxii*

L78–90 cm (33 in): S181–219 cm (79 in): T27–36 cm (12 in): ♂84%

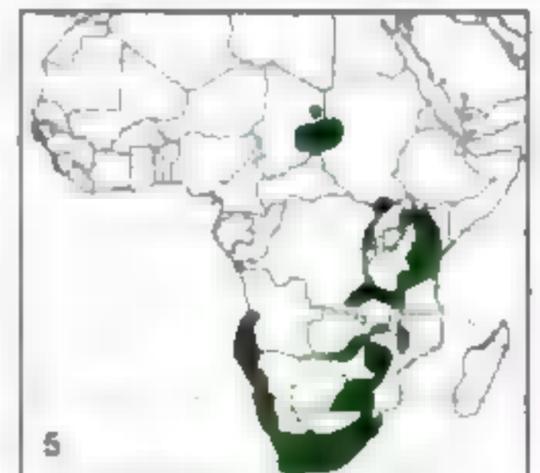
Mountains, gorges, cliffs, crags in desert or thorn-scrub, to 5,000+ m. Large eagle; long paddle-shaped wings unusually broad across outer secondaries, pinched in at base; longish tail often part-spread; prominent head; wing-tips reach tail-tip. Deep strong beats; glides on flat or slightly raised wings; soars in shallow V, fingers upturned. Catches prey by stoop or from perch, or by skimming along rock face; staple food often rock hyraxes *Procavia*/*Heterohyrax*. Generally in pairs.

**226a Adult (male)** All black perched, but for thin white V on back; bare brows/eye-rings yellow. Flight below (**226ax**: ♀): black linings and dark grey secondaries; whitish windows. Above (**226ay**: ♂): greyer-white windows; thin-armed broad-based Y of pure white on back/rump. Catching rock hyrax *Procavia capensis* (**226az**).

**226b Juvenile (female)** Golden crown, often streaked, and rufous nape/mantle contrast black cheeks; dark above, coverts scaled buff (tips of greater forming bar); brown-streaked white rump, barred tail; pale brown throat streaked darker; sooty chest, rufous to buff abdomen blotched blackish; creamy-buff legs. Flight below (**226bx**: ♂): shape as **a**, but tail longer; buff-mottled blackish linings; buff-tipped dark-barred secondaries/tail; buff-white windows. Above (**226by**: ♀): scaled coverts; pale crown, rump, windows, and trailing edges to blackish quills.

**226c Fourth-year (female)** Black feathers gradually appear during 2/3-yr, though diagnostic pale trousers usually retained into 3-yr; plumage then mainly dark grey-brown with buff nape and lower back, buff-edged coverts/abdomen, whitish rump. Flight below (**226cx**: ♂) and above (**226cy**: ♀): intermediate between **b**/**a**.

Text and map page 748



229ay



229cx



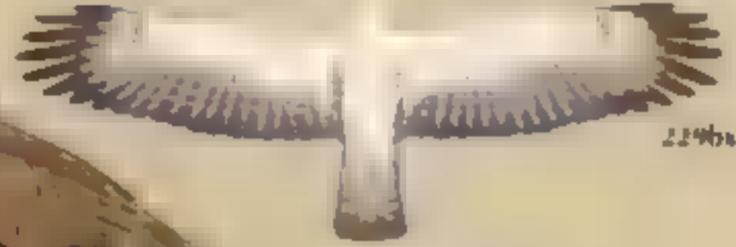
229dx



229ax



229cx



229bx

229a



229c



229h



229d

226cy



226by



226ay



226az



226a



226ax



226b



226bx



226a



226cy

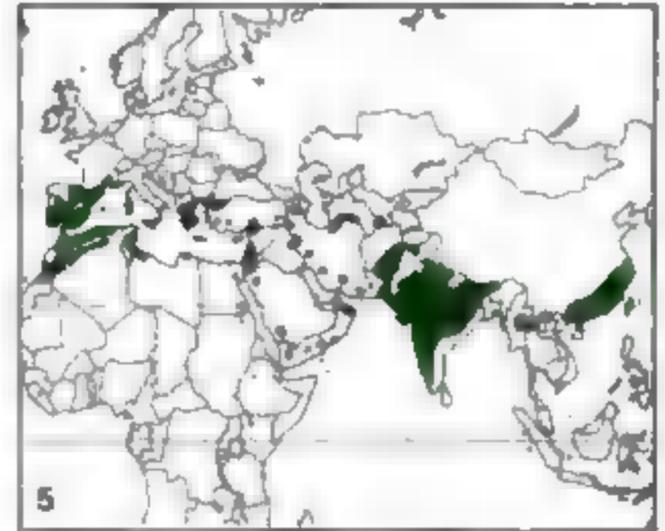


## PLATE 83: EURASIAN AND AFRICAN HAWK EAGLES

### 227 Bonelli's Eagle *Hieraetus fasciatus*

Text and map page 750

L55–67 cm (24 in): S142–175 cm (62 in): T24–29 cm (10 in): ♂89%  
Mountains, cliffs, gorges, woodland, to 2,000 m, in Asia to 3,000 m (3,750 m); some winter lowlands, wetlands. Smallish eagle; broad wings, long tail, small protruding head, like big 18/19; wing-tips reach tail-band. Loose shallow beats; glides flat, wrists forward; soars little, wings flat/just raised. Usually in pairs. [cf. 18/19/153; c206b/228b]



**227a Adult (male)** (nominate; whole range bar b) Dark brown above; capped head, white patch on back; tail grey, obscurely barred, with broad subterminal band; white below with thin streaks, broader on breast/flanks, bars on belly/crissum. Flight below (**227ax**: ♀): white body, black band on linings; obscure dark trailing edges to greyish remiges; subterminal band on paler tail. Above (**227ay**: ♂): white on back; grey tail, dark band.

**227b Adult (female)** (*renschii*, Lesser Sundas) Flight below. Smaller; quills more clearly barred; belly/thighs/crissum more boldly marked.

**227c Juvenile (female)** Paler; streaked crown, all-banded tail; pale rufous below, thin streaks; buff abdomen. Flight below (**227cx**: ♂): pale rufous linings with thin midwing-line; quills barred, whitish windows. Above (**227cy**: ♀): grey windows, barred tail.

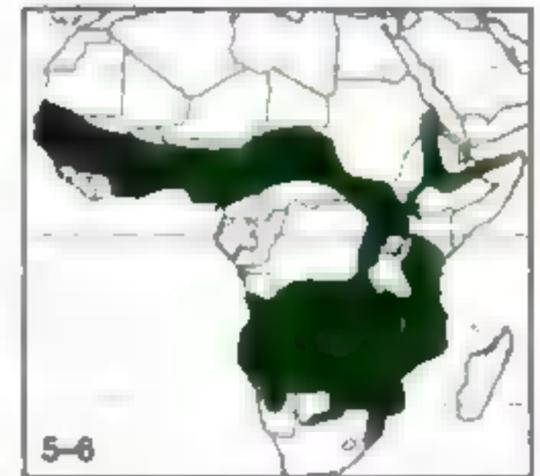
**227d Third-year (male)** Intermediate; variably rufous to cream below, plain or streaked; dark subterminal band developing on tail; ad by 4/5-yr.

### 228 African Hawk Eagle *Hieraetus spilogaster*

Text and map page 753

L55–62 cm (23 in): S132–150 cm (56 in): T23–29 cm (10 in): ♂87%

Wooded savannah, open woods, riverine thornbush, to 1,500 m (3,000 m). Often made conspecific with 227 but shorter-winged, longer-tailed, differs in ecology/behaviour. Flight similar; hunts more in cover like big accipiter. [cf. 227/232]



**228a Adult (male)** Black above, white flecks; subterminal band on barred grey tail; white below, drop-like streaks (more on ♀), plain thighs/vent. Flight below (**228ax**: ♀): mottled black mid-wing, much white on remiges, black trailing edges; black tail-band. Above (**228ay**: ♂): greyish windows/tail, black trailing edges.

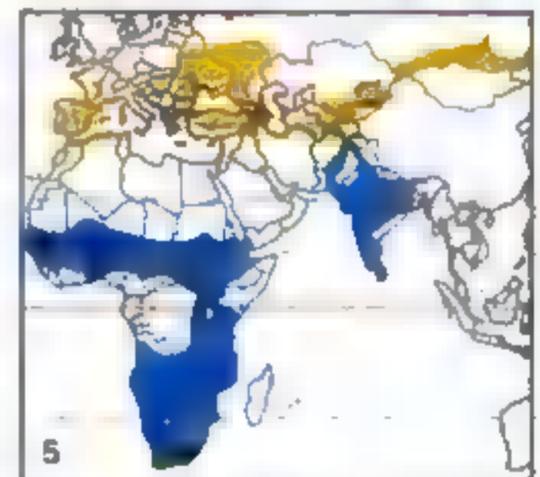
**228b Juvenile (female)** Dark brown above, crown streaked; rufous below, thin breast-streaks, paler legs. Flight below (**228bx**: ♂): body and linings rufous, sparsely marked; broken midwing-line; whitish primary-patches; greyish-buff secondaries/tail thinly barred. Above (**228by**: ♀): contrasting creamy windows; barred tail.

### 230 Booted Eagle *Hieraetus pennatus*

Text and map page 758

L42–51 cm (18 in): S113–138 cm (49 in): T19–22 cm (8 in): ♂78%

Woods, hills, savannah, desert, to 3,000 m. Small buteo-sized eagle; narrow parallel-edged wings, longish tail; wing-tips near tail-tip. Loose deep beats; glides on arched wings, fingers upswept; soars flatter, wings pressed forward. Spectacular stoops. Solitary, even on passage. [cf. 18/19/203/54; b39/100f; Afr a229b/232d]



**230a Pale adult (male)** Brown above, wings broadly edged buff; white shoulder 'lights'; blackish cheeks, streaked throat; creamy below, or tinged rufous and streaked. Flight below (**230ax**: ♀): dark cheeks, cream body/linings; black remiges, pale wedges on inner primaries; grey-brown tail darker near tip. Above (**230ay**: ♂): broad buff band across wings and buff scapulars, whitish U above tail.

**230b Dark adult (female)** As a above, including white shoulder 'lights'; below, dark chestnut-brown, but thighs and tail-coverts often mottled white. Flight below (**230bx**: ♂): all dark but for pale wedges on inner primaries, grey-brown tail darker near tip.

**230c Pale juvenile (female)** Very like a, and often indistinguishable, but usually more rufous head, less sharply defined streaking below.

227cy

227cy

227bx

227a

227c

227cx

227d

228ay

228by

227b

228a

228b

228bx

228cx

230ay

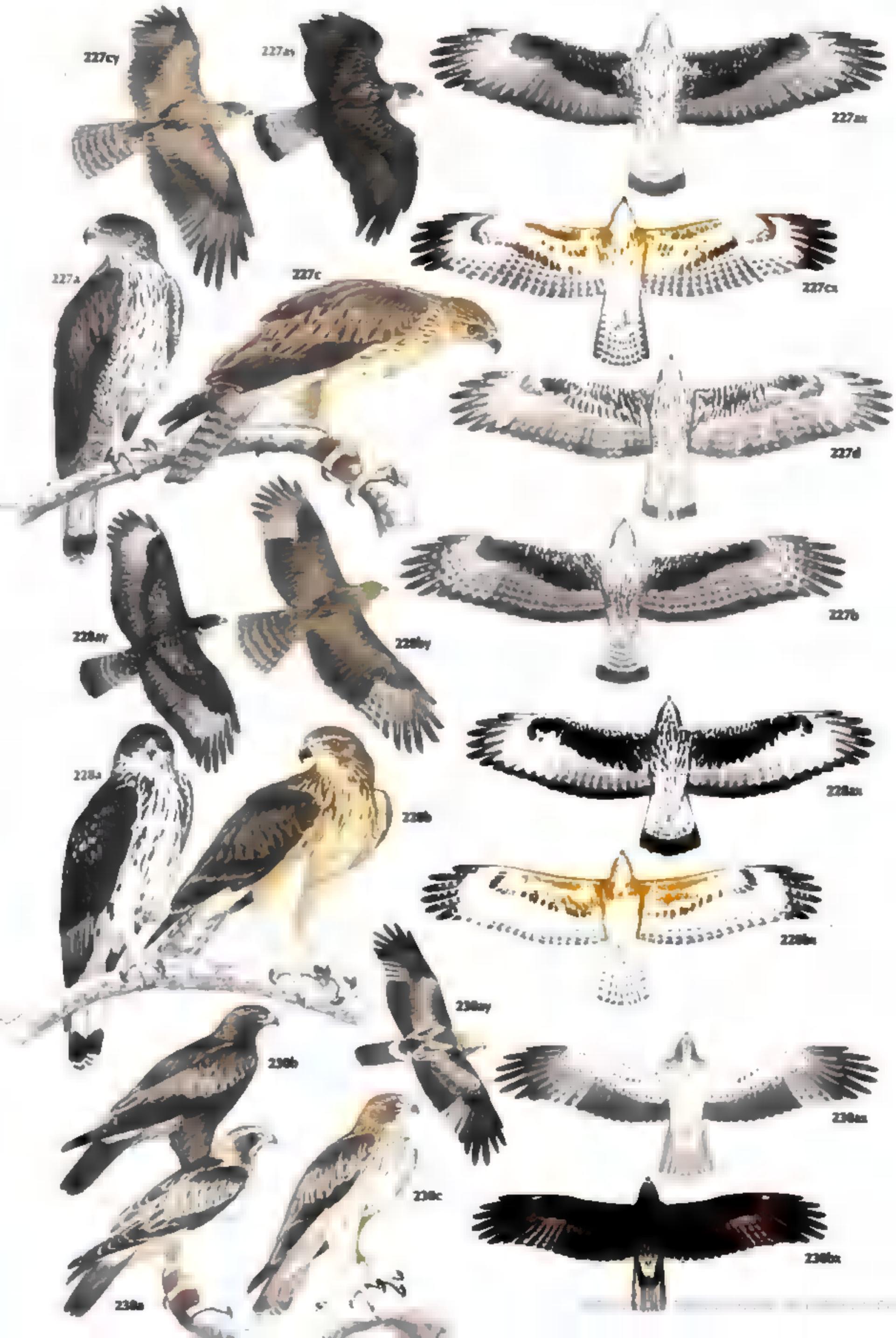
230b

230bx

230a

230c

230bx



## PLATE 84: AFROTROPICAL HAWK EAGLES

### 232 Ayres's Hawk Eagle *Hieraaetus ayresii*

L44–57 cm (20 in): S106–137 cm (48 in): T17–23 cm (8 in): ♂76%

Forest edge, riverine woods, to 3,000 m. Small eagle, smaller and stockier sex for sex than 228; broad wings, medium tail, round head, slight crest usually flat, feathered legs. Loose deep beats; glides soars (very high) on flat wings; stoops like falcon, chases among trees like accipiter. Scarce; little seen. [cf. 228/230]

**232a Adult male** Blackish above, pale-edged; white forehead and usually supercilia; white shoulder 'lights' as 230; grey tail barred blackish, wider subterminal; white below, variably spotted blackish (least on throat/legs). Flight above, stooping in heart-shape (232ax); dark; no windows, unlike 228; barred tail. (Prey: Cape Turtle Doves *Streptopelia capicola*.)

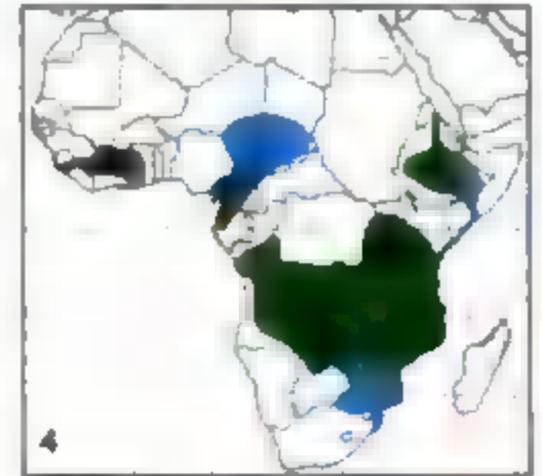
**232b Adult female** Distinctly larger; more hooded, usually little or no white forehead/supercilia; heavier blotches below, often coalescing on parts of breast/flanks; eyes more orange. Flight below (232bx): blotched body/linings, well-barréd quills.

**232c Dark adult (rare: male)** All black, or breast flecked white, some with white forehead/supercilia; still white shoulder 'lights'. Flight below (232cx): all black but for barred remiges/tail.

**232d Juvenile male** Grey-brown above, scaled whitish; forehead/supercilia rufous-buff, crown/mantle dark-streaked rufous-buff; pale rufous-buff below, thinly streaked on breast/flanks; eyes grey-brown. [♀ less rufous-buff on forehead/supercilia.] Flight below (232dx): rufous but for lightly barred greyish remiges/tail.

**232e Second(third?)-year male** Much as a, but buff-tinged, less heavily spotted.

Text and map page 763



### 235 Long-crested Eagle *Lophaelagus occipitalis*

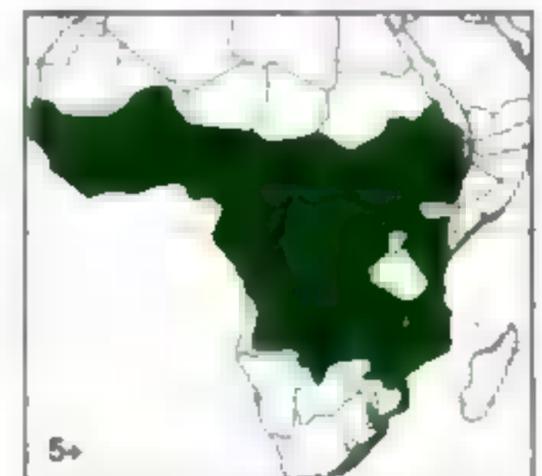
L50–58 cm (21 in): S112–129 cm (47 in): T19–25 cm (9 in): ♂81%

Woodland, riverine trees, plantations, cultivation, savannah, to 2,000 m (3,000 m). Small black eagle; broad rounded wings, relatively longish tail, remarkable long floppy crest. On tree, pole or fence; drops to ground or flaps/glides perch to perch; often soars.

**235a Adult (male)** Black but for white-edged shoulders, white legs, banded tail. [♀ crest slightly shorter, tarsal leathers sometimes mixed brown/white.] Flight below (235ax: ♀): black body/linings, pale feathered legs; large white windows, barred secondaries; banded tail. Above, dropping to ground (235ay): white windows; tail-bands.

**235b Juvenile (female)** Browner, whitish tips, more white on shoulders; short crest; eyes grey/brown. Flight below (235bx: ♂): white-mixed linings; thin tail-bars. Above (235by): tail-bars. (Prey: swamp rat *Hamys temnatus*.)

Text and map page 769



### 236 Cassin's Hawk Eagle *Spizaetus africanus*

L50–56 cm (21 in): S108–113 cm (43 in): T21–27 cm (9 in): ♂82%

Dense forest, to 2,300 m. Small sturdy eagle; short rounded wings, relatively long tail. Perches in canopy; soars. [cf. 87/151/228/232]

**236a Adult (male)** Blackish above, white bases; barred tail, subterminal band; white below, but blotched black on chest-sides, flanks, outer thighs. Flight below (236ax: ♀): white body, much black on linings; quills clearly barred, with wider trailing edges. Above (236ay): some whitish mottling, barred quills. (Prey: Cuvier's fire-footed tree squirrel *Funisciurus pyrropus*.)

**236b Juvenile (female)** Brown above, edged buff; thinly barred tail; rufous head streaked black; white below, variably buff-tinged, spotted on breast and more heavily on flanks/belly; feathered whitish legs; vent spotted brownish. Flight below (236bx: ♂): black-spotted buff linings, thinly barred quills.

**236c Second/third-year (male)** Flight below. Intermediate in plumage.

Text and map page 770





## PLATE 85: LARGE AFROTROPICAL EAGLES AND SECRETARYBIRD

### 246 Crowned Hawk Eagle *Stephanoaetus coronatus*

L80–95 cm (34 in): S151–181 cm (65 in): T30–40 cm (14 in): ♂76%

Forest, woodland, riverine acacia, to 3,000+ m. Large eagle; short broad rounded wings, longish tail, double crest usually flat, feathered legs/short toes; wing-tips to tail-base. Fast beats; glides flat, soars in slight V. In canopy; still-hunts small antelopes, strikes monkeys on wing. Noisy in display: ♂ melodious *koore*, ♀ deeper mellow *koore*. Solitary. [b248b]

**246a Adult (male)** Slate-black above; 2 grey tail-bands; browner head, black-tipped crest; cream (esp. ♂) to rufous (esp. ♀) below, blotched/barréd black (more on ♀); cere grey. Flight below (**246ax**: ♀): rufous linings, 2 rows of black spots; black subterminal, 2 thinner bars, on white quills. Above (**246ay**): same on grey-brown quills. (Prey: suni *Nesotragus moschatus*.)

**246b Juvenile (female)** Pale grey-brown above, coverts scaled white; 4 dark tail-bands; white head/underparts, chest washed rufous at first; legs and crown become spotted in 1-yr; eyes/cere grey. Flight below (**246bx**: ♂): white; linings washed rusty; remiges as a; tail subterminal thinner, 3 other bars. Above (**246by**: ♀): head white; forearms scaled white; 4 dark bars on quills.

**246c Second/third-year (female)** Flight below. Head/underparts become pale rufous and gradually more blotched/barréd; quills as a by end 2-yr.

Text and map page 788



### 248 Martial Eagle *Polemaetus bellicosus*

L78–96 cm (34 in): S188–227 cm (82 in): T27–32 cm (12 in): ♂76%

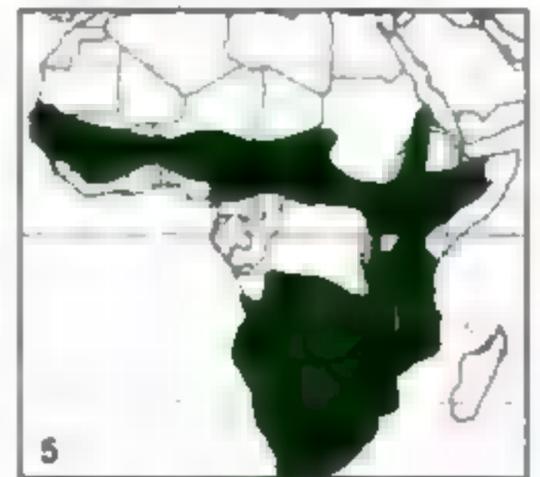
Woodland edge, thornbush, subdesert, to 3,000 m. Very large eagle; long wings rather pointed, shortish tail, short crest, feathered legs/long toes; wing-tips near tail-tip. Flexible beats; glides/soars on flatish wings; will hover. Stoops to ground, strikes in air, pirates raptors, still-hunts. Perches out in open, large shoulders forward. Solitary. [a69a; b246b]

**248a Adult (male)** Brown-grey above, edged paler; browner head/chest; barréd tail; white abdomen sparsely spotted; cere/feet pale greenish. Flight below (**248ax**: ♀): white abdomen contrasts dark head/linings and closely barréd quills (♀ more heavily built, more spotted below). Above (**248ay**): dark brown with barréd quills. (Prey: Helmeted Guineafowl *Numida meleagris*.)

**248b Juvenile (female)** Paler brown-grey above, edged whitish; white below; tail/cere/feet as a, eyes brown. Flight below (**248bx**: ♂): white linings brown-mottled; barréd quills.

**248c Fourth-year (female)** In flight. First dark feathers on head/breast/linings in 3-yr; gorget and spots below in 4/5-yr. [As a by 6/7-yr.]

Text and map page 792



### 249 Secretarybird *Sagittarius serpentarius*

L112–150 cm (51 in): S191–215 cm (80 in): T57–85 cm (28 in): ♂107%

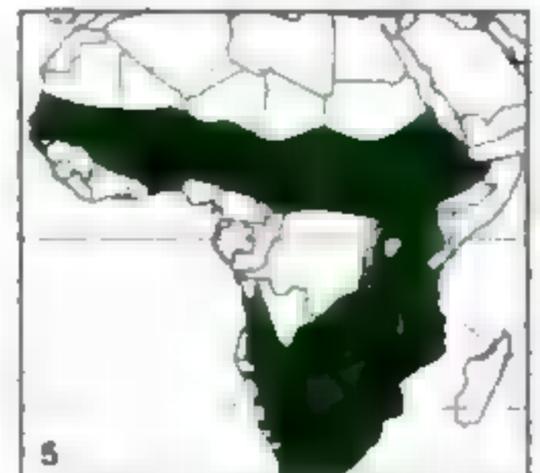
Open/wooded grassland, thornbush, semi-desert scrub, to 3,000 m. Very large terrestrial raptor; rounded wings, graduated tail elongated in centre, smallish bill, long mobile crest, long neck, very long bare legs. Walks steadily, head to and fro; runs rather than flying, but also soars; roosts on trees. Solitary/families; groups near water. More like crane/bustard.

**249a Adult male** Blue-grey above, whitish-grey below; black head-plumes, remiges, subterminal tail-band, and belly/thighs; eyes brown, face orange, legs flesh. Flight below (**249ax**): solid grey and black. Above (**249ay**): similar; rump black, tail-coverts white or barréd. (Prey: striped ground squirrel *Xerus erythropus*.)

**249b Adult female** Slightly smaller, darker; crest and tail often shorter.

**249c Juvenile** Much as a; shorter tail/crest, grey eyes, yellow face; linings tinged brown. Sometimes all grey areas much browner (**249cx**).

Text and map page 794





## PLATE 86: CARACARAS I

### 252 Carunculated Caracara *Phalcoboenus carunculatus*

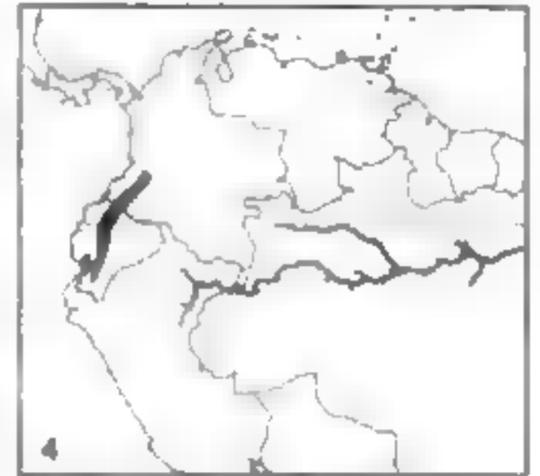
L50–56 cm (21 in): S112–119 cm (45 in): T19–22 cm (8 in): ♂98%

Open slopes, windswept pastures, at 3,000–4,000 m. Largish slim caracara; long well-fingered wings, longish rounded tail; weak bill/legs, wrinkled bare face, curly crown; wing-tips far down tail. Flight/behaviour as 253, perhaps conspecific. [b253b/256b]

**252a Adult** Black with white-streaked breast, white thighs/crissum, rump, quill-tips; bare face orange-red. Flight below (252ax): black remiges and white-tipped tail; white linings/thighs, streaked breast. Small flock among llamas *Lama glama* (252ay).

**252b Juvenile** Brown; paler head/rump/underbody obscurely mottled buff; darker quills; face/legs greyish. (Prey: earthworm.) Flight below (252bx): brown with pale patches at bases of primaries.

Text and map page 798



### 253 Mountain Caracara *Phalcoboenus megalopterus*

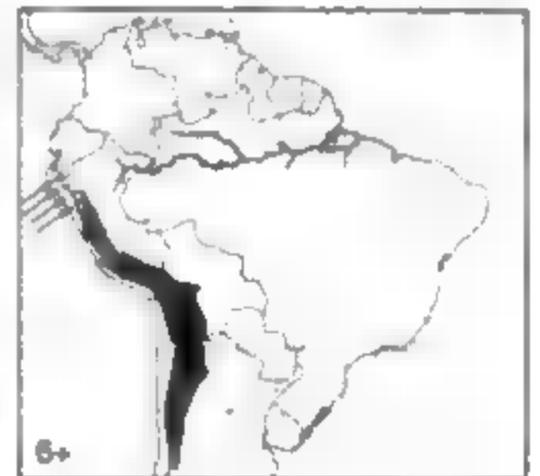
L48–55 cm (20 in): S111–124 cm (46 in): T19–23 cm (8 in): ♂86%

Bare slopes, crags, plains, at 3,000–7,000 m (down to 1,000 m and below in S). As 252 but face not wrinkled. Flies low, swept on winds, wings flat or half-closed; soars flat. Crow-like; scavenges on ground, scratches for food. Solitary; flocks near abundant food. [b252b/254b]

**253a Adult** Glossy black above and to chest; white rump, quill-tips and belly/thighs/crissum; face red-orange, bill-base bluish, legs orange-yellow. Flight below (253ax): black chest/quills, white linings/belly/tail-tip. Scavenging near hut (253ay).

**253b Juvenile** Much as 252b, but darker redder-brown with more black shaft-streaks and whitish tips; clearer pale rump. Flight below (253bx): rusty with paler rufous primary bases.

Text and map page 799



### 254 Darwin's Caracara *Phalcoboenus albogularis*

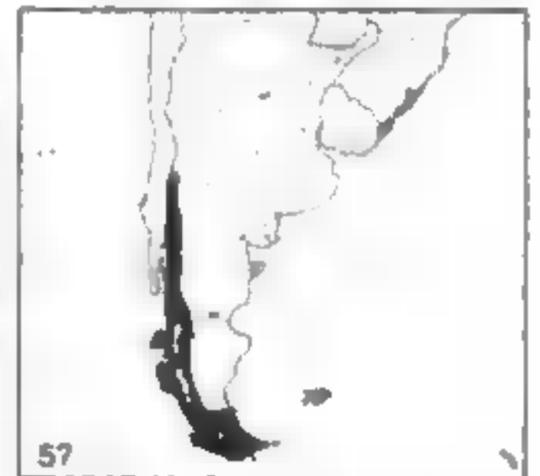
L49–55 cm (20 in): S110–119 cm (45 in): T21–23 cm (9 in): ♂93%

Lower mountain slopes, open woodland, scrub, to 3,000 m; down to sea-level in S. Much as 252/253 in shape/flight/behaviour; all three best regarded as forming a superspecies. Groups at carcasses. More usual name 'White-throated Caracara' misleading. [b253b/255b]

**254a Adult** Brown-black above, less glossy than 252/253; still white rump/quill-tips; all white below (not only 'throat') but for dusky mottling on chest-sides to flanks; face orange-yellow, bill-base bluish. Flight below (254ax): white body/linings; blackish quills, white-banded primary bases, white tail-tip.

**254b Juvenile** Much as 252b/253b but all darker brown; forehead/cheeks blackish; abdomen mottled.

Text and map page 801



### 255 Forster's Caracara *Phalcoboenus australis*

L55–60 cm (23 in): S116–125 cm (47 in): T23–25 cm (9 in): ♂93%

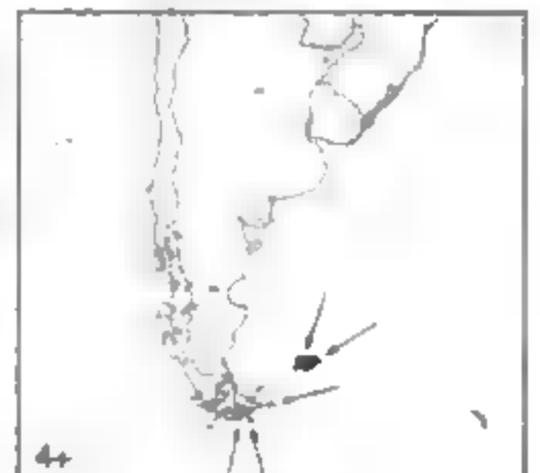
Rocky coasts, tussock grass. Large caracara; shape/flight as 252–254; pointed crown-leathers, not curly crest. Scavenges at seabird colonies; digs for food in winter. [b254b]

**255a Adult** Blackish, streaked white on neck/underparts; white tail-tip, rufous thighs; bare face orange-pink. Flight below (255ax): rufous linings/thighs; blackish quills, white windows/tail-tip.

**255b Juvenile** Dusky brown, neck/chest flecked cinnamon; chestnut tail; bare parts grey. (Prey dead juvenile Magellanic Penguin *Spheniscus magellanicus* by colony.) Flight below (255bx): blackish-brown with paler tail; smaller whitish areas at bases of primaries.

**255c Second-year** Neck/chest more streaked; face/legs yellow, bill bluer.

Text and map page 802





## PLATE 87: CARACARAS II

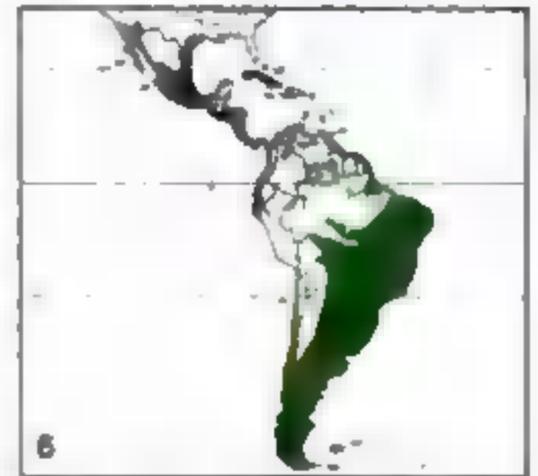
### 256 Crested Caracara *Caracara plancus*

L51–64 cm (23 in): S107–133 cm (47 in): T17–25 cm (8 in): ♂93%

Savannah, grassland, timbered scrub, open woodland, farmland, to 2,000 m (3,000 m, and recorded to 3,800 m). Largest caracara; long parallel-edged fingered wings, longish neck/tail/legs, big head/bill, flat crest, bare face; tips of wings well down tail. Slow steady beats; glides on slightly arched wings, wrists forward; soars flat, straight-edged, with eagle-like head projection. Walks/runs easily; scavenges as other caracaras, cruising roads for crushed corpses, joining vultures at carcasses (often for maggots), taking eggs/sick animals; also agile aerial pirate. Distinctive *kñk kñk* and rattle. Solitary; gregarious at food. [cf. 258/257/177/1]

- 256a Adult** (*auduboni*; USA/W Panama/Cuba) Black-brown above with black crown, white cheeks, throat, barred nape/mantle; chest; barred tail, broad terminal band; black belly/thighs, cream crissum; face yellow to orange-red, bill whitish with pale blue base.
- 256b Adult** (*cheriway*; E Panama/N Peru/Amazonia) Blacker above; more extensive barring. Flight below (**256bx**): black belly/wings, white throat, barred chest/windows/tail, broad terminal band. Above (**256by**): similar, but black crown, smaller windows.
- 256c Adult** (nominate; S Peru/S Brazil to Tierra del Fuego) Larger in extreme S; back/breast/crissum still more extensively barred.
- 256d Juvenile** (*auduboni*) Browner than a (especially crown); buff cheeks/throat, streaked mantle/breast; face pinkish-grey, legs yellow-grey.
- 256e Juvenile** (*cheriway*) Flight below. Buff head, streaky chest (cf. b).

Text and map page 804



### 258 Chimango Caracara *Mitvago chimango*

L37–43 cm (16 in): S80–99 cm (35 in): T16–20 cm (7 in): ♂89%

Open country, esp farmland, also wetlands, mountain slopes, scrub-desert, to 3,000 m (4,000 m). Smallest caracara; as 257, but flatter head, longer wings. Measured beats; glides on bowed wings, soars flatter. Perches anywhere; nests even in rushes. Follows cattle or plough, often 50+ with gulls behind tractor. Chatters/squeals when nesting. Social at food or roost. [cf. 256/257b; c253b/254b]

- 258a Adult** (nominate; E Bolivia to Uruguay/Argentina) Cinnamon-brown, crown/nape streaked darker, back, wings edged paler; whitish rump; grey-buff tail thinly barred, broad subterminal; below, dusky streaks, obscure grey bars, buff throat/crissum; bill horn, legs whitish, feet bluer. Flight below (**258ax**): brown linings, pale windows, dark tail-end. Flock following tractor (**258ay**).
- 258b Adult** (*temucoensis*; S Chile/SW Argentina) More red-brown, heavier markings.
- 258c Juvenile** (nominate) Much as a but tinged rufous, more pale edges; subterminal tail-band obscure. Flight below (**258cx**): paler throat/lower abdomen; larger windows; no clear subterminal.

Text and map page 808



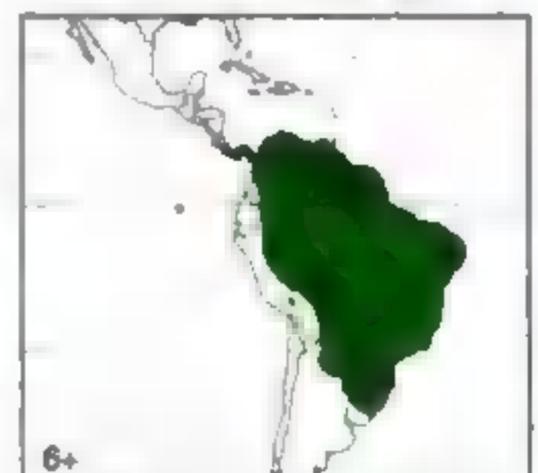
### 257 Yellow-headed Caracara *Mitvago chimachima*

L40–46 cm (17 in): S81–95 cm (35 in): T18–21 cm (8 in): ♂97%

Savannah, scrub, timbered ranchland, riverine forest, to 1,800 m (2,600 m). Small slim caracara; longish rounded wings/tail, weak bill/legs, bare lores; wing-tips well down tail. Buoyant beats; glides on bowed wings; soars little. Often on ground, esp by roads/rivers, or perches in tree tops; searches cattle for ticks. Scavenger. Often social, esp. at food. [cf. b258c/185d]

- 257a Adult** Black-brown above, thinly edged whitish; head/underbody all cream to buff, crown, nape slightly rusty-tinged, dusky line behind eyes; buff tail finely barred, wide subterminal; bill pale blue, legs green. Flight below (**257ax**): buff body/linings; fine-barréd windows and tail, dark secondaries and tail-end.
- 257b Juvenile** Browner above; buff-tipped crown, obscure tail-band; all streaked blackish below. Flight below (**257bx**): body/linings mottled/streaked, throat paler; quills as a but for tail-end.

Text and map page 806





256m



256n



256a



256d



256c



256b



256by



256by



258m



258c



258ca



258a



258b



257ca



257a



257ca



257b

## PLATE 88: CARACARAS III AND LAUGHING-FALCON

### 251 Red-throated Caracara *Daptrius americanus*

L43–56 cm (19 in): S96–124 cm (43 in): T21–30 cm (10 in): ♂96%

Forest and edges/clearings, to 1,500 m. Largish slim but gawky caracara; longish wings, long rounded tail, small head, bare face, chicken-like bill, short legs. Slow heavy beats, short glides; seldom much above trees. Does not scavenge like other caracaras; feeds mainly on wasp/bee larvae and fruits. Mostly high in trees, sometimes down on ground. Noisy; exceptionally loud raucous *ah-ah-ah-ahou*, often extended into quarrelsome cacophony. Often in parties. Like small short-necked version of any of the white-bellied black curassows (Cuculidae). [cf. 250]

**251a Adult** All glossy black but for grey-streaked cheeks, contrasting white belly/thighs/crissum; eyes red/brown, face red, bill yellow with greyish base, legs orange-red. Flight below (**251ax**): black; contrasting white belly. Party in trees (**251ay**).

**251b Juvenile** Much as **a**, but less gloss, little streaking on cheeks; face yellowish and with scattered feathers, legs yellower. (Feeding on social-wasp larvae; wings hanging, grips nest, makes hole and thrusts in head, apparently immune to stings.)

Text and map page 797



### 250 Black Caracara *Daptrius ater*

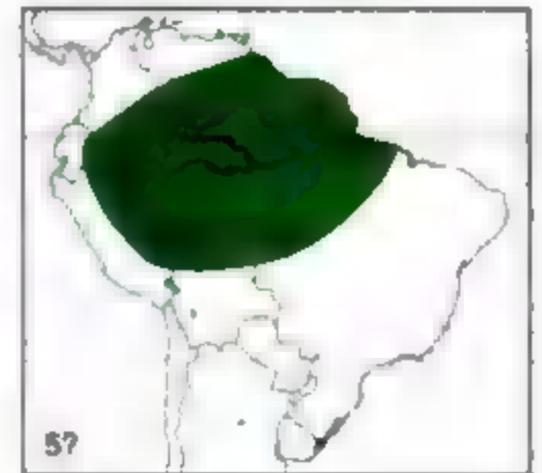
L41–46 cm (17 in): S91–100 cm (38 in): T18–20 cm (7 in): ♂99%

Forest edges/clearings, riverine woods, mangroves, savannah, to 600 m. Small caracara; not unlike **251**, but narrower wings, shorter tail. Flight similar but less laboured; rarely, if ever, soars. Not specialised feeder like **251**, but general scavenger of carrion, insects, dead fish, eggs and nestlings; also takes palm and other fruits. Not confined to trees, and often settles on ground or river sandbars. Descending hoarse scratchy *kra-a-a-a-a-a-a*, harsh screams/cracks in flight; less loud than **251**. Less social, but often in families. [cf. 251]

**250a Adult** Glossy black; white band at tail-base; legs/face orange (throat yellower), eyes red-brown, bill black. Flight below (**250ax**): black; pale throat; partly hidden white tail-band.

**250b Juvenile** Much as **a** but black less glossy, obscurely tipped; barred buff below; 3–4 extra narrow whitish bars on basal half of tail; legs/face yellow, eyes brown. (Feeding on green figs *Ficus*.) Flight below (**250bx**): as **a** but for more barred tail.

Text and map page 796



### 260 Laughing-falcon *Herpetotheres cachimans*

L43–52 cm (19 in): S75–91 cm (33 in): T18–24 cm (8 in): ♂98%

Forest edges/clearings, riverine woodland, *cerrada*, to 1,500 m (2,500 m). Mid-sized primitive falcon; shortish rounded wings, longish rounded tail, large head/eyes, stout bill, short legs rough-scaled; wing-tips cover tail-base. Rapid stiff beats, short glides; no soaring; wags tail on landing. Sluggish; perches upright in open. Still-hunts, esp snakes. Noisy, esp dusk/dawn, even after dark: far-carrying *wah'co, wah'co...* (2nd syllable lower) often for over 1 min, increasing in tempo and becoming more rhythmic (cf. **265**), often in duet; shorter chuckling or muffled 'laughing' less common. Solitary. [cf. 257]

**260a Adult** (nominate; whole range bar **b**) Dark brown above; head/underbody and rump cream/buff with dusky shaft-streaks on crown, broad black mask extending around hindneck, sometimes dusky spots on thighs; creamy bands and tip on blackish tail. Flight below (**260ax**): cream/buff body; buff/rufous-buff linings, often some dusky spots; buff-based remiges barred towards tips; banded tail.

**260b Adult** (*fulvescens*; Pacific Panama–NW Peru) Smaller, richer buff.

**260c Juvenile** (nominate) As **a**, but edged paler brown above; buff areas perhaps whiter (but adults similarly variable in colour intensity). (Prey: coral snake *Micrurus fulvius*.)

Text and map page 811



251ay



251a



251b



251ax



250ax



250bx



250b



250a



260ax



260a



260c



260b

## PLATE 89: FOREST-FALCONS I

### 261 Barred Forest-falcon *Micrastur ruficollis*

L31–38 cm (14 in): S46–60 cm (21 in): T15–19 cm (7 in): ♂95%

Forest, to 2,700 m (3,000 m). Small forest-falcon (note **261c-fx** drawn to smaller scale than **a-b**); shape, flight and behaviour as **262**. Series of sharp barks *kaah, kah, kah...* like distant small dog; also slowing cackles. [cf. 262/265/153]

**261a Rufous adult** (nominate; E/S Brazil/NE Argentina/Bolivia) Rufous cheeks/back/throat/chest; 3 white tail-bars; barred abdomen. Flight below (**261ax**): rusty linings/whitish remiges barred.

**261b Grey adult** (nominate) Grey above; all white below, mostly barred.

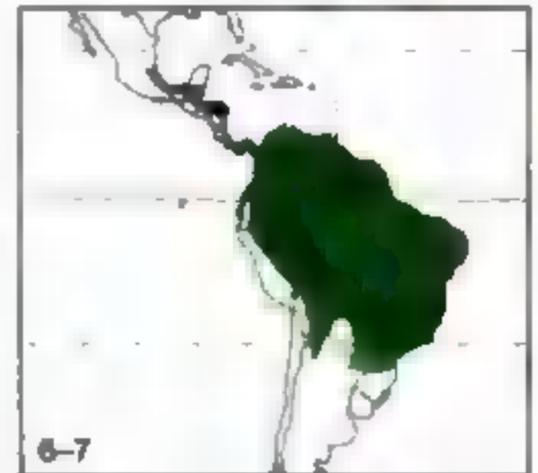
**261c Rufous adult** (*zonothorax*; N Venezuela/E Colombia/NE Peru) Dusky rufous back; rusty-brown cheeks/throat/chest. Flight below (**261cx**).

**261d Grey adult** (*zonothorax*) Back slate-grey; thin-barrred white below.

**261e Adult male** (*guerilla*; S Mexico/Nicaragua) Slate above; grey throat; grey breast/white abdomen barred. Flight (**261ex**): browner ♀.

**261f Juvenile** (*guerilla*) Dark brown above, wings edged rufous; thin buff collar; variably buff below, usually coarse barring. But some plain buff (**261fx**). Barrred juvenile nominate flight below (**261fy**).

Text and map page 813



### 262 Lined Forest-falcon *Micrastur gilvicollis*

L32–38 cm (14 in): S51–60 cm (22 in): T14–19 cm (6 in): ♂90%

Forest, to 1,500 m. Small forest-falcon; short rounded wings, longish rounded tail, longish legs; wing-tips to tail-base. Resembles **261** (though relatively longer wings/shorter tail) and formerly thought conspecific. Rapid beats through cover. Furtive; seldom seen. Mostly heard: 2-note lament. [cf. 261]

**262a Adult** Slate-grey above; 1–2 white bars on black tail (not 2–4, especially 3, as **261**); white below, breast finely barred (no rufous morph); cere/lores red-orange (not orange-yellow), eyes white (not orange-brown to yellow). Flight below (**262ax**): whitish, thinly barred; 1–2 white bars and tip on blackish tail. [Juvenile very like **261f**, apart from plain rump (not white-spotted).]

Text and map page 815



### 263 Plumbeous Forest-falcon *Micrastur plumbeus*

L30–34 cm (13 in): S51–55 cm (21 in): T12–14 cm (5 in): ♂97%

Forest, to 1,500 m. Small forest-falcon; as **262** but shorter tail/relatively longer wings; often treated as conspecific. Flight/behaviour probably similar but little known. [cf. 261]

**263a Adult** Slate-grey above, paler on head/neck/mantle; only 1 white tail-bar, pale tail-tip; pale grey throat; grey chest and whitish abdomen finely barred (sometimes indistinctly so on abdomen, rarely plain); eyes yellow-grey to red-brown, cere yellow to yellow-orange, and feet yellow to orange-red. Flight below (**263ax**): whitish with grey throat, fine barring; one tail-bar.

**263b Juvenile** Above much as **a**, including only one tail-bar; all white to pale buff below, with variable sparse barring on breast/flanks.

Text and map page 817



### 264 Slaty-backed Forest-falcon *Micrastur mirandollei*

L40–44 cm (17 in): S65–71 cm (27 in): T18–20 cm (7 in): ♂96%

Forest, to 500 m. Mid-sized forest-falcon; shape as **262**, but tail relatively short. Low undergrowth, or on ground. Mostly heard: nasal *kaanh* 8–13 times, falling/rising/accelerating; or varied with double note *ou-wah* at end (or one then other syllable repeated); or passerine-like 'weet' series. [cf. 261/265]

**264a Adult** Slate-grey above, paler cheeks; blackish-grey tail with 3 thin white to grey bars and tip; white to cream below, scattered shaft-streaks; bare parts yellow(ish). (Prey Spotted Antbird *Hylophylax naevoides*.) Flight below (**264ax**): white linings; thinly barred remiges, broad trailing edges; 3 faint tail-bars.

**264b Juvenile** Browner above; broadly mottled dusky below, especially breast.

Text and map page 818





## PLATE 90: FOREST-FALCONS II AND SPOT-WINGED FALCONET

### 265 Collared Forest-falcon *Micrastur semitorquatus*

L46–58 cm (20 in): S72–86 cm (31 in): T28–30 cm (10 in): ♂90%

Forest, edges, dense secondary growth, scrub, riverine forest, to 1,500 m (2,000 m). Large slender forest-falcon; long graduated tail; as 261–266, short rounded wings, stout untoothed bill, bare lores, slight facial ruff, shortish toes; wing-tips to tail-base. Stays in understory, flying perch to perch, dashing through cover, even running. Seldom in open, or crossing clearings, but near dusk calls from forest-edge perch: loud slow *aaa...aaa...*, resonant, not accelerating. [cf. 266/148g; bP261f]

- 265a Pale adult** (nominate; S.America E. of Andes) Blackish above with white collar; 3–4 white tail-bars (5–6 on outer feathers) and tip; black cap in crescent to lower cheeks; mid-cheeks and underbody all white; cere/lores dull yellow-green. Darker variant (**265ax**): some intermediate a/b, cream, washed buff below (cf. b). Flight below (**265ay**): white linings; boldly barred remiges; white bands, tip on dark tail.
- 265b Buff adult** (nominate) As a, but variably buff below; collar may still be white. Flight below (**265bx**): linings buff as body.
- 265c Dark adult** (nominate) All sooty-black (no collar) but for white tail-bands; often some white speckles/bars on lower flanks.
- 265d Buff adult** (*nasa*; Mexico/Ecuador W of Andes/NW Peru) As b, but slightly larger/darker. [Again 3 morphs in *nasa*, but dark very rare.]
- 265e Pale juvenile** (nominate) Dark brown above, edged and barred tawny; crown blackish; cheek pattern less clear and collar may be obscure or absent; tail as a or tinged brownish; white below, variably washed rufous on chest, coarsely barred blackish.
- 265f Buff juvenile** As e but buff below, with more rufous, and browner bars. Flight below (**265fx**): linings as body; quills as b.

Text and map page 820



67

### 266 Buckley's Forest-falcon *Micrastur buckleyi*

L41–48 cm (18 in): S61–72 cm (26 in): T22–24 cm (9 in): ♂95%

Forest, to 700 m (and recorded 1,800 m). Largish forest-falcon; shape as 265 but smaller, with shorter legs, relatively short tail. Little known. [see 265]

- 266a Adult female** Blackish above, white below, with white collar, black cheek-crescents and 3–4 white tail-bands, as 265; but 3–4 bars (not 5–6) on outer tail-feathers, and ♀ [not ♂] also white spots on secondaries. Flight below (**266ax**): white linings as body, boldly barred quills, like small shorter-tailed 265.
- 266b Juvenile** Dark brown above, edged and barred tawny; blacker crown, buff collar, tail much as a; so like 265e except bars below confined to lower breast/flanks; chest/crissum plain buff. Flight below (**266bx**): strongly barred but for chest/crissum.

Text and map page 822



7

### 259 Spot-winged Falconet *Spizapteryx circumcinctus*

L25–31 cm (11 in): S46–54 cm (20 in): T13–15 cm (6 in): ♂78%

Xerophilous woodland, dry savannah/scrub with mesquite/thorn trees, semi-desert with cacti, to 500 m (?750 m). Small primitive falcon (bill untoothed, stout feet with hexagonal scales, as 260–266); rounded wings, longish rounded tail; wing-tips only part down tail. Fast shallow parrot-like beats, with glides. Perches hidden in trees (and said to hop/clamber upwards rather than fly), sometimes in open on posts, poles or pylons. Mostly solitary.

- 259a Adult male** Grey-brown above, streaked dusky; white rump, spots on wings; white-tipped tail with 4 side-bars (centre plain); white supercilia/loral stripes join obscure collar; streaky black cheeks, black moustaches; white below, usually tinged buff, thinly streaked on chest. Flight below (**259ax**): white linings variably buff-tinged, sometimes few streaks; remiges/tail barred with white spots. Above (**259ay**): greyish with white rump/supercilia; bold spots on remiges/tail-sides.
- 259b Adult female** Much as a but larger. [juvenile apparently also similar.]

Text and map page 810



4+?



## PLATE 91: AFRICAN AND INDOMALAYAN PYGMY-FALCONS I

### 267 African Pygmy-falcon *Polihierax semitorquatus*

L18–21 cm (8 in): S34–40 cm (15 in): T7–8 cm (3 in): ♂97%

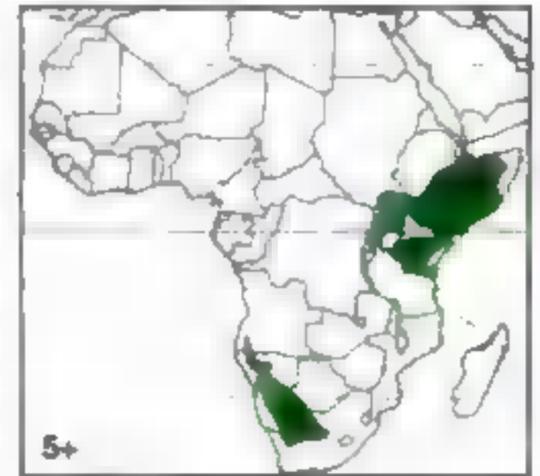
Dry thornbush, subdesert scrub, to 1,600 m. Tiny shrike-like falcon; shortish pointed wings, rounded tail; wing-tips less than half down tail. Distinctive fast undulating flight like woodpecker. Perches mornings/evenings on tree tops and open branches, often hobbing head before taking flight and wagging tail when excited; more in shade in heat of day. Still-hunts, mainly insects/lizards, by dive to ground; watches by turning head almost through 180°. Mostly silent except when nesting. Breeds in nests of various social weavers. Pairs/families.

**267a Adult male** Blue-grey above; white forehead, thin collar (often partly hidden), white rump; white spots on black quills, white tips on secondaries/tail; white below; cere/legs red-orange. Flight below (**267ax**): white linings/body; well-barred quills.

**267b Adult female** Much as **a** except for chestnut patch on back; fractionally larger. (Dismembering desert locust *Schistocerca gregaria*.)

**267c Juvenile male** Much as **a** but edged rufous above, washed buff below. [Juvenile ♀, with chestnut back, differs in same ways from **b**.]

Text and map page 823



5+

### 268 White-rumped Pygmy-falcon *Polihierax insignis*

L24–27 cm (10 in): S42–45 cm (17 in): T12–13 cm (5 in): ♂92%

Dry forest edges/clearings, savannah woodland, also more open country, to 900 m. Small shrike-like falcon; shortish slightly rounded wings, long well-rounded or graduated tail; wing-tips less than half down tail. Flight has been described as weak, fluttering and parrot-like, but in fact undulates like **267**. Similarly perches on high bare branches, still-hunts insects, lizards and frogs by diving down to ground. Breeds in tree holes and in nests of other birds. Long descending whistle. Solitary/pairs. [cf. 269/270 on size alone]

**268a Adult male** (*cinereiceps*, Tenasserim/Thailand/Laos) Slate-grey above with dark-streaked whitish head/neck/mantle; browner remiges with concealed white spots; white rump; black tail, plain in centre, barred and tipped white on outer feathers; all white below. Flight below (**268ax**): white linings/body, dark-barred remiges; blacker tail with white bars and tip. [Adult ♂ nominate (upper Burma): paler above; some streaking on breast/flanks.]

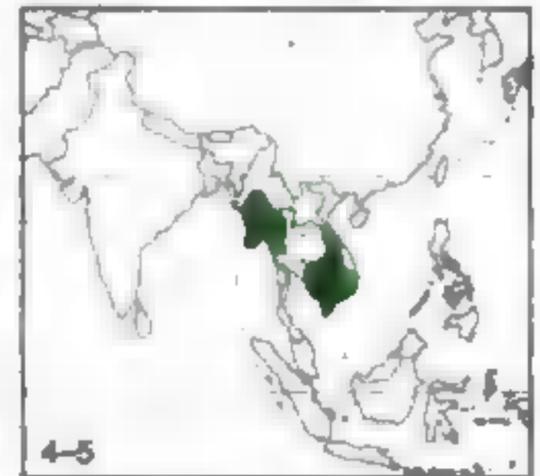
**268b Adult male** (*harmandi*, S Laos/Cambodia/S Vietnam) Very similar to **a** and dividing line not clear (probably clinal), but typically head paler, more whitish, with thinner dusky shaft-streaks.

**268c Adult female** (*cinereiceps*) As **a**, but crown/nape/mantle rufous-chestnut with less dusky streaking except on forehead and above eyes (where erroneously shown white here).

**268d Juvenile male** (*cinereiceps*) Much as **a** above, but head more heavily streaked down to breast and, more lightly, to flanks/thighs.

**268e Immature female** (*cinereiceps*) Rufous-chestnut present on crown/nape (to some extent in 1st plumage?) long before streaks below lost.

Text and map page 825



4-5

### 271 White-fronted Falconet *Microhierax latifrons*

L14–16 cm (6 in): S28–31 cm (11.5 in): T5–6 cm (2 in): ♂91%

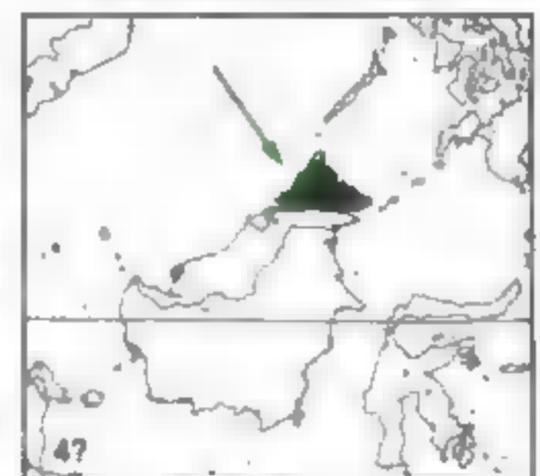
Forest clearings with dead trees, to 1,200 m. Minute falcon (**269–271** smallest of all raptors); pointed wings, shortish tail; wing-tips over half down tail. Flight/behaviour as **270**. Food especially dragonflies, caught in fly-catching sallies. [cf. 270]

**271a Adult male** All glossy blue-black above, including triangular extension on neck-sides and black mask, except forehead/forecrown white; tail plain; white below with tawny wash on belly/crissum, but black flanks and outside thighs; cere/feet black. Flight below (**271ax**): white linings flecked blackish; blackish remiges barred white; plain dark tail, dark flanks/thighs.

**271b Adult female** As **a**, except whole forehead/forecrown rufous-chestnut.

**271c Juvenile male** As **a**, but whole forecrown and also cheeks buff. [Juvenile ♀ same, but some rufous-chestnut on forecrown at early stage.]

Text and map page 829

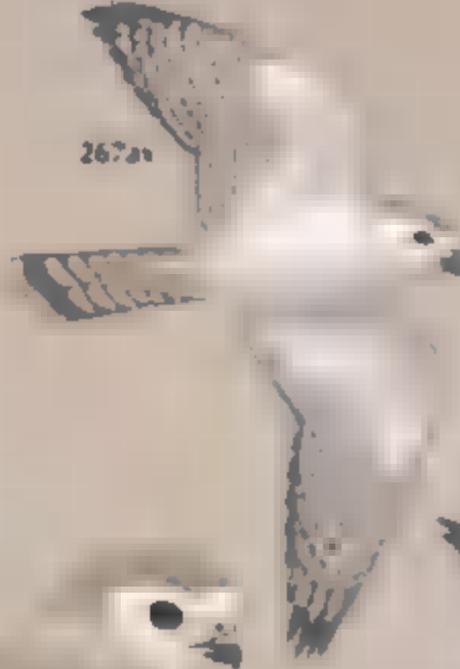


47

267a



267a1



267b



268a1



267c



268a



268d



268c



268e



268b



271a



271b



271c



271a1



## PLATE 92: INDOMALAYAN FALCONETS

### 269 Collared Falconet *Microhierax caerulescens*

L14–17 cm (6 in): S28–34 cm (12 in): T6–7 cm (2.5 in): ♂80%

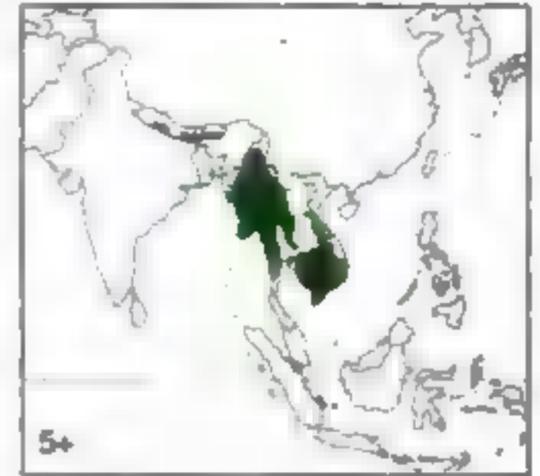
Forest edges/clearings, to 1,700 m (2,000 m). Minute falcon; shape/behaviour as 270 (once thought conspecific). [cf. 270/273]

**269a Adult** (nominate; W Himalayas/Assam) Glossy black above; white forehead, supercilia and collar, curved black mask; rusty-white below, dark rufous throat and lower abdomen/thighs; cere/feet black. Flight below (**269ax**): linings whitish like breast, darker rufous throat/abdomen; barred remiges, wider trailing edge; 4 white bars on black tail. In old barbet hole (**269ay**).

**269b Adult and 269bx** (*burmanicus*, Burma/SE Asia) Wide collar; whiter breast.

**269c Juvenile** (*burmanicus*) White areas of head rufous; pale-edged above when fresh; some whiter below. (Prey: longhorn beetle *Batocera celebiana*.)

Text and map page 826



### 270 Black-thighed Falconet *Microhierax fringillarius*

L14–16 cm (6 in): S27–32 cm (11.5 in): T5–6 cm (2 in): ♂91%

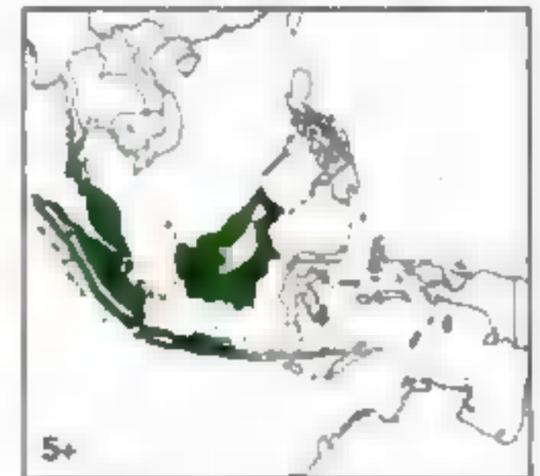
Forest edges/clearings, cultivation, to 1,500 m. Minute shrike-like falcon; pointed wings, squarish-ended tail often spread. Fast beats/glides. Sallies like flycatcher from dead branches; also hawks insects on wing or drops to ground. Nests/roosts esp in barbet holes. [cf. 269/271]

**270a Adult male** Glossy black above; white forehead/arc by black cheeks, no collar; white or rufous-washed throat, white breast shading to rufous abdomen; black flanks and outside thighs; cere/legs black. Flight below (**270ax**): quills as **269ax**; throat paler, abdomen with more rufous, flanks black.

**270b Adult female** Longer-tailed; undertail barred white in both sexes.

**270c Juvenile male** As a but white areas of head rufous; pale-edged above when fresh.

Text and map page 828



### 272 Philippine Falconet *Microhierax erythrogenys*

L15–18 cm (6.5 in): S32–37 cm (13.5 in): T6–7 cm (2.5 in): ♂88%

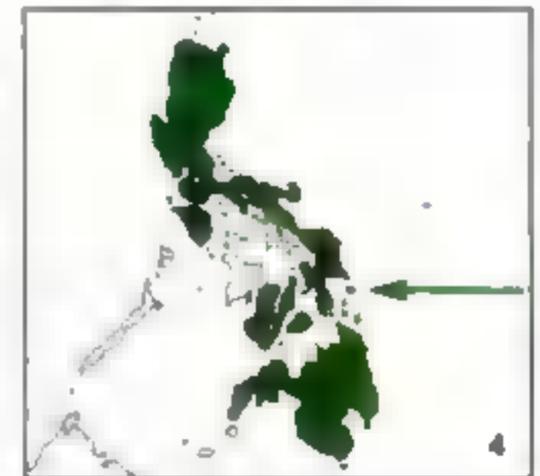
Forest edges/clearings; rivers, to 1500+ m. Minute falcon; slightly larger and longer-tailed than 270. Similarly waits on high dead branches, flies up after insects, nest/roosts in barbet/woodpecker holes. Sometimes small groups.

**272a Adult male** All glossy black above except for white lower cheeks/ear-coverts; all white below (belly may be buff-washed) but for black flanks/thighs [not shown on plate]; cere/feet black. Flight below (**272ax**): black linings (unlike all other *Microhierax*) and plain black tail/flanks/thighs [not shown] contrast sharply with clear white body; white spots on inner webs of remiges form indistinct broken bars (cf. b).

**272b Adult female** Flight below. Wings solid black; [black flanks not shown].

**272c Juvenile female** As a/b, but ear-coverts tinged tawny-yellow; [black flanks and thighs not shown].

Text and map page 830



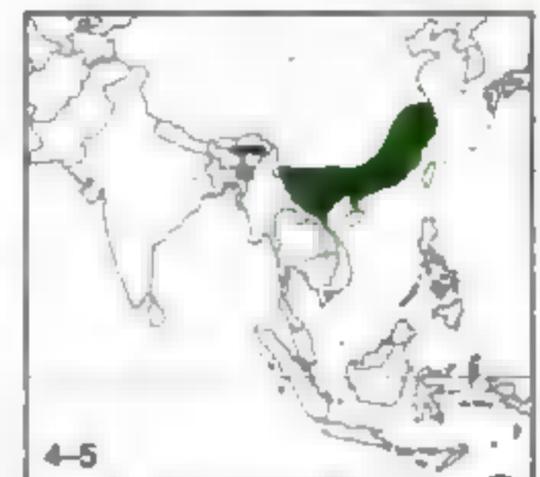
### 273 Pied Falconet *Microhierax melanoleucus*

L16–18 cm (6.5 in): S33–37 cm (14 in): T7–8 cm (3 in): ♂90%

Forest clearings, wooded foothills, tea plantations, timbered rivers, especially with high dead branches, to 1,500 m. Minute falcon even if just largest and longest-tailed of this sparrow-sized genus. Flight/behaviour as 270/272, also takes lizards, small mammals and birds to thrush size. [cf. 269]

**273a Adult/Juvenile** All glossy black above, white below, black sides/flanks [not shown on plate]; white arc around cheeks (as 270), usually white forehead, rarely thin collar; like most congeners, white spots on inner webs of secondaries and tail; cere black, feet browner. Flight below (**273ax**): all-white body/linings, but black bodysides/flanks [not shown]; white-banded blackish remiges; white bars on black tail.

Text and map page 831





269a

269a1

269a1

269b

269c

269b1

270b

270a1

270c

270a

272a1

272a

272b

272a1

272c

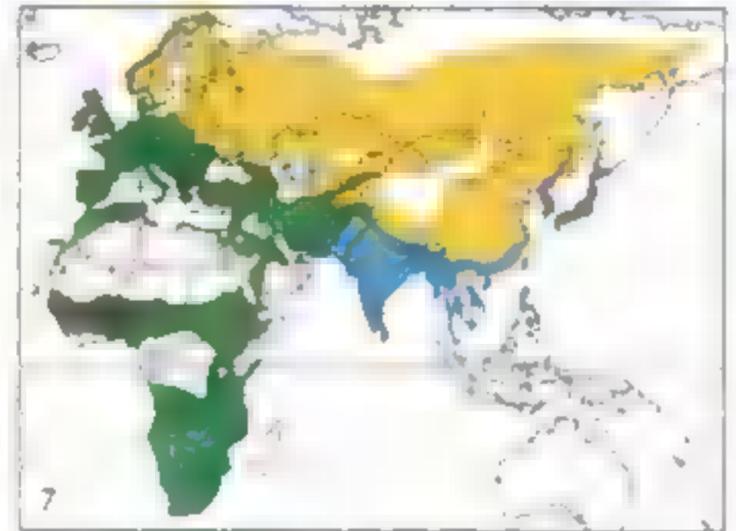
272c1

## PLATE 93: COMMON KESTREL

### 277 Common Kestrel *Falco tinnunculus*

L27–35 cm (12 in): S57–79 cm (27 in): T13–19 cm (6 in): ♂87%  
 Widespread wherever cliffs or scattered trees, breeding to 3,500 m, occurring to 5,500 m: moorland, steppe, semi-desert, small islands, wetlands, open woods, savannah, cultivation, especially roadsides, locally cities. Smallish falcon; long pointed wings, long round-tipped tail; wing-tips well short of tail-tip. Fast shallow beats with glides and twists; soars with tail fanned, flat wings looking much more rounded like accipiter; also recalls accipiter when flying among trees with wings held in. Characteristic hovering head to wind, hanging motionless in upcurrent or with fast shallow beats, tail fanned, before dropping in 2–3 stages on to prey; also flies at small birds. Perches upright, more horizontally on cables. Solitary; small groups on migration. [cf. 275/in Afr 283]

Text and map page 843



- 277a Adult male** (nominate; Pal, winters S to Malawi/Sri Lanka) Chestnut back/coverts black-spotted, contrasting blue-grey head, rump and tail, last with wide black subterminal band and white tip; narrow dark moustaches, whitish throat; buff below with black spots/streaks on breast/flanks; claws black (cf. 275a). Flight below (277ax): buff-white linings spotted like breast, whitish remiges finely grey-barrred, darker wing-tips, greyish tail with black subterminal. Above (277ay): chestnut back contrasts blackish wing-ends/secondaries and blue-grey head/rump/tail, but head colour and spots on back not always clear (cf. 275a).
- 277b Adult male** (*rufescens*; sub-Saharan Africa to Tanzania/N Angola) Much darker than a (which winters same areas); slate-grey head more streaked; deeper chestnut back, bolder spots; tail darker, some barring; deeper buff below, heavier markings.
- 277c Adult male** (*dactotiae*; E. Canaries) Palest of 4 small island races in Canaries and Cape Verdes (cf. d); paler above than a, although more rufous-cream and somewhat more heavily marked below.
- 277d Adult male** (*neglectus*; N Cape Verdes) Smallest Atlantic island race and very dark (cf. c); darker than a, crown streaked, back/wings darker chestnut with heavier spots, and tail lightly barred.
- 277e Adult male** (*objurgatus*; S/W India/Sri Lanka) Smaller than a; heavy bars on dark chestnut back, some tail-barring; bold blotches below.
- 277f Adult female** (nominate) Mostly rufous-brown above (but rump blue-grey, tail often and head sometimes grey, even blue-grey), heavily barred blackish on mantle/coverts, more spotted on back/rump; tail with thin bars (may be reduced or incomplete) and broad subterminal; ill-defined moustaches; creamy-buff below, more streaked than ♂; claws black (cf. 275b). Flight below (277fx): streaked breast/flanks, creamy-buff linings spotted/flecked; quills usually clearly barred, subterminal tail-band obvious. Above (277fy): blackish wing-ends contrast dark-barrred rufous inner wings/back; more spotted rump shows greyer (more rarely rufous as shown); and barring on spread tail usually obvious enough, even on (older?) birds with head/tail strongly tinged blue-grey. Hovering (277fz).
- 277g Adult female** (*rufescens*) Deeper rufous-chestnut above than f and also more heavily barred; richer buff and bolder-streaked below.
- 277h Adult female** (*rupicolus*; S Africa) ♂♀ both paler than *rufescens* (cf. b/g); ♀ as ♂ but for stronger tail-bars (lost with age), darker greyer head.
- 277i Adult female** (*dactotiae*) Relatively even paler than c; palest ♀ of all.
- 277j Juvenile** (nominate) Often barely separable from adult ♀ (f), but tends to heavier streaks on head, broader bars on mantle/coverts, paler below; cere greenish (not yellow; plate inaccurate); tail grey or brown with often incomplete barring and thinner subterminal band; juvenile ♀ rump usually more barred, ♂ sometimes plain blue-grey. Flight above (277jx): as fy but shorter rounded-tipped wings; primary coverts usually clearly pale-tipped.
- 277k Second-year male** (nominate) With moult of body in Aug-Apr of 1-yr, starts to show adult ♂ feathers, but still variably rufous on crown and barred on back and tail until 3-yr.

277a



277i



277iz

277h



277j



277k



277k



277h



277ax



277ix



277c



277e



277ay



277b



277d



277i



277ix

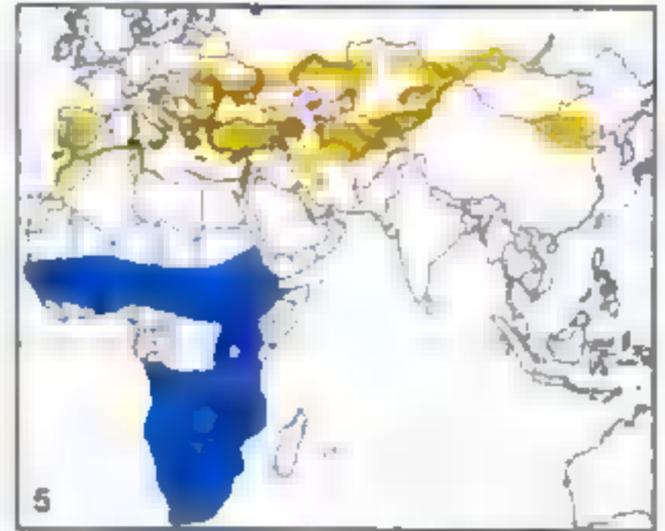


## PLATE 94: EURASIAN AND AFROTROPICAL KESTRELS

### 275 Lesser Kestrel *Falco naumanni*

Text and map page 834

L:26–31 cm (11 in): S:62–73 cm (27 in): T:13–16 cm (6 in): ♂99%  
 Open dry lowlands, e.g. steppe, semi-desert, poor cultivation, to 1,000 m (1,500+ m), on migration to 3,700 m; winters savannah, grassland. Smallish slim falcon; very like 277, but marginally broader wings slightly less pointed; slightly shorter tail often projecting in centre (beware 277 in moult); wing-tips near tail-tip [nearer than shown]. Faster flatter beats; hovers less, often kites. Takes insects on ground or in flight, esp at grass fires; hunts moths in artificial light. Colonial; 1,000s at Afr roosts. [cf. 277; a114a]



- 275a Adult male** As 277, but no spots above, bluer head, tail, grey-blue band on wings, faint moustaches (may be absent), cream to rufous-buff below; usually few small dusky spots on breast/flanks; claws pale brown to white (cf. 277). Flight below (**275ax**): linings whiter than body, spotted or plain; generally plain whitish remiges, primaries dark-tipped; black subterminal on greyish tail. Above (**275ay**): blue diagonal between blackish hands and chestnut back/forearms; blue head and subterminally banded tail. Flock hawking insects near colony in old barn (**275az**).
- 275b Adult female** Not certainly separable from 277f on plumage, though often thinner greyer moustaches, narrower bars above, less heavy streaks below; but claws as a. Flight below (**275bx**): wings whiter than 277f, linings often more finely spotted, remiges less barred. Above (**275by**): thinner bars more spaced.
- 275c Juvenile** Not certainly separable from b, though paler, with pale edges above; juvenile ♀ has bars above heavier (but still thinner than 277j).
- 275d Immature male** After moult Nov-May of 1-yr, head/body much as a but remiges, greater coverts and tail-sides still c.

### 283 White-eyed Kestrel *Falco rupicoloides*

Text and map page 855

L:29–37 cm (13 in): S:68–84 cm (30 in): T:13–18 cm (6 in): ♂90%  
 Grassland with trees, semi-desert, to 2,150 m. Smallish-medium falcon; like 277 but more thickset, esp head bigger. Loose shallow beats; often hovers (**ax**), and will dash after prey or chase flying birds, but usually still-hunts arthropods. Sluggish, on one perch for long periods; prefers pylons, high branches as lookouts, but will use fences, termite mounds or bushes. Breeds in old nests, esp of crows. Solitary. [cf. 277f; 275bc]

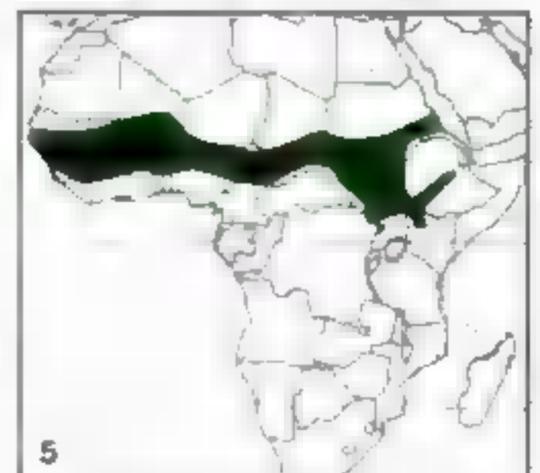


- 283a Adult** (nominate; S Africa) ♂♀ resemble ♀ 277; all tawny-rufous, barred above, thinly streaked breast, barred flanks, whitish crissum; rump/tail grey with black bars, broader subterminal, white tip; eyes cream/brownish-white (other kestrels brown). Flight below (**283ax**): cream/white linings and thin barred remiges contrast dark-marked rufous body more than any other ♀-type kestrel; blackish tips and trailing edges sharper than 275ax; barred grey tail. Above (**283ay**): ♀-type kestrel with barred grey tail; pale spots show on inner webs of remiges.
- 283b Adult** (*fieldi*; N Kenya/Ethiopia/Somalia) Smaller; much paler.
- 283c Juvenile** nominate: Much as a, but rump/tail rufous and more thinly barred; flanks streaked (not barred); eyes dark brown, cere blue-white (not yellow). [Some streaks on linings in flight.]

### 284 Fox Kestrel *Falco alopex*

Text and map page 857

L:32–38 cm (14 in): S:76–88 cm (32 in): T:18–21 cm (8 in): ♂91%  
 Lowland dry savannah, semi-desert with rock outcrops, but to 2,200 m in Eritrea. Mid-sized slim falcon; long pointed wings, unusually long tail almost pointed. Stiff flat beats, with glides. Rarely, if ever, hovers; still-hunts; catches insects on wing in swarms or at grass fires. Solitary.



- 284a Adult** Foxy-rufous above, crown thinly streaked, back/wings more broadly; 15+ thin tail-bars, often faint; paler below, breast thinly streaked. Flight below (**284ax**): rufous body, plainer buff linings; dark-barred white remiges black-ended; barred rufous tail. Above (**284ay**): all rufous with blackish remiges.
- 284b Juvenile** Slightly heavier streaks on wings, broader bars on tail.



## PLATE 95: AFRO-MALAGASY GREY KESTRELS

### 285 Grey Kestrel *Falco ardosiacus*

L28–33 cm (12 in): S58–72 cm (26 in): T13–16 cm (6 in): ♂73%

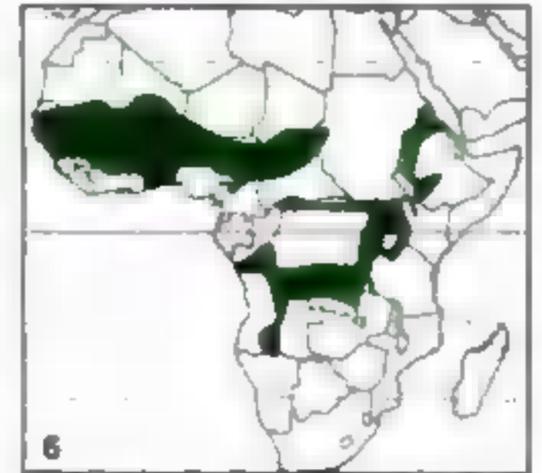
Palm savannah, wooded grassland, cleared forest, riverine trees, to 1,800 m. Smallish thickset falcon; shortish pointed wings, longish wedged tail, large head/bill; wing-tips well short of tail-tip (cf. 292). Fast shallow beats; generally low over open ground or among trees, sweeping up to perch; also soars. Still-hunts insects/lizards with slant to ground from high branch or cable; chases birds low, usually taking them on ground; attends termite swarms (cf. 292) but perhaps less at fires (cf. 286). Hovers in some areas, 'never' in others. Chases bats, but usually diurnal (cf. 292/286). Solitary. [cf. 292]

**285a Adult male** All slate-grey; dusky shaft-streaks esp on head/neck; blackish primaries. Flight below (**285ax**): grey, with obscure whitish barring on primaries; tail. Above (**285ay**): grey, with whitish spots showing on inner webs of blackish primaries, obscure grey spots on lateral tail. Hovering (**285az**), but see previous paragraph.

**285b Adult female** Simply larger (dimorphism greater than many other kestrels).

**285c Juvenile female** Not separable in field: tinged browner, abdomen paler.

Text and map page 858



### 286 Dickinson's Kestrel *Falco dickinsoni*

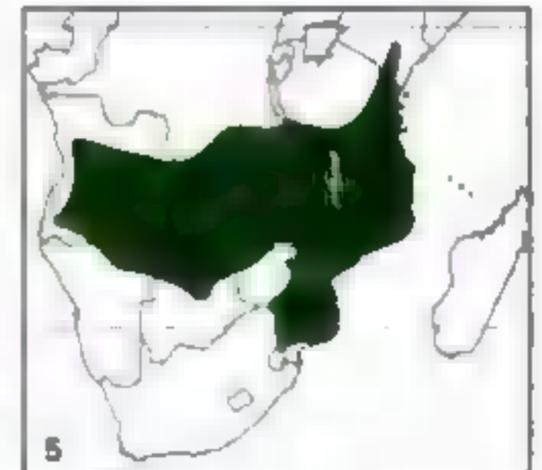
L27–30 cm (11 in): S61–68 cm (25 in): T13–15 cm (6 in): ♂87%

Lowland savannah with dum or palmyra palms *Hyphaene/Borassus*, coconuts, cultivation, open woodland, often by water, locally to 1,200 m. Smallish stocky kestrel; as mainly allopatric 285, but smaller head, larger eyes, rounded tail. ♀s not so big. Likewise hunts from perch, slanting to ground; also hovers, kites, follows plough. At fires (**az**), stoops at birds/insects and eats them in flight. Often hawks bats at dusk. Solitary.

**286a Adult (female)** Black-streaked pale grey head/rump contrast blackish back/wings; tail also pale grey with thin black bars, broad subterminal band; variably grey or grey-brown below, finely streaked blackish, but throat and crissum paler. Flight below (**286ax**): linings varying from grey to greyish-brown as body; paler head/crissum; barred primaries/tail, secondaries plain slate. Above (**286ay**): contrast between blackish back/wings, whitish head/rump and clearly barred tail; white spots show through on spread primaries. Attending grass fire (**286az**).

**286b Juvenile (male)** Very like a (especially those browner below), but for fine white barring on flanks; cere much paler yellow at first.

Text and map page 860



### 287 Madagascar Barred Kestrel *Falco zoniventris*

L27–30 cm (11 in): S60–68 cm (25 in): T14–15 cm (6 in): ♂88%

Forest, wooded savannah, cultivation between forested ridges, to 2,000 m. Small falcon; relatively short/broad pointed wings, longish tail. Mainly still-hunts, taking insects/lizards on ground and from trees, often flying 150–200 m from perch on bare branch to snatch chameleon from dense foliage. Solitary. [cf. 292]

**287a Adult male** Darkish grey above, back/rump bluer, all shaft-streaked and faintly barred; blackish tail barred grey-white at sides; whitish fore head, thin supercilia; white below, throat/chest streaked brown, rest boldly barred grey-brown. Flight below (**287ax**): barred dusky except streaked chest; dark-tipped wings and tail. Above (**287ay**): grey with bluer rump; black tail barred at sides; whitish spots on primaries.

**287b Adult female** Much as a apart from size, but darker slate-grey above.

**287c Juvenile** Browner above, edged/spotted tawny/rufous; light streaks on hindneck; lateral tail marks obscure; as a/b below but bars browner. (Prey: flap-necked chameleon *Chameleo dilepis*.) Flight below (**287cx**): as ax but for buff/rufous tail-bars. Above (**287cy**): as ay but browner; tail all dark unless open.

Text and map page 861





## PLATE 96: ENDEMIC INDIAN OCEAN ISLAND KESTRELS

### 278 Malagasy Spotted Kestrel *Falco newtoni*

1.25–29 cm (11 in): S49–63 cm (22 in): T11–13 cm (5 in): ♂82%

Forest edge, wooded savannah, plains, cultivation, roadsides, villages, towns, to 1,800 m (2,300 m). Small falcon; shortish pointed wings, medium tail. Still-hunts ground prey from open perch; also hovers, hawks insects. Sometimes crepuscular. Solitary.

**278a Pale adult male** (nominate; Madagascar) Rich chestnut back/wings, sparsely black-spotted; grey-rufous head, slight moustaches; black-spotted grey rump; black-barred grey tail, subterminal band, white tip; blackish primaries; whitish below, breast streaked, belly spotted, throat/thighs crissum plain. Flight below (**278ax**): all whitish, streaked on breast, spotted on abdomen/linings, thinly barred on quills. Above (**278ay**): chestnut with blackish hands, grey rump and barred tail.

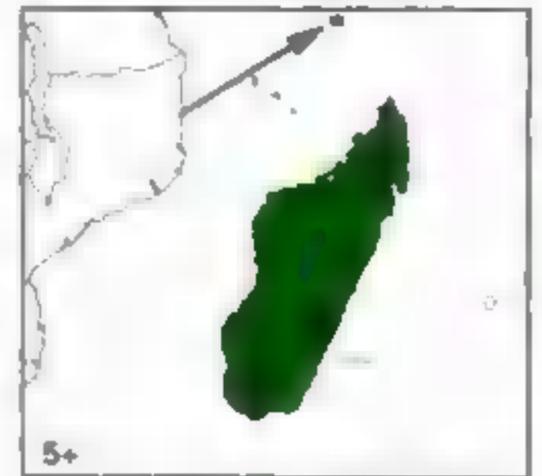
**278b Dark adult male** Markings as a, but rich dark chestnut all over; crown/nape blackish; legs orange. Hovering (**278bx**): chestnut linings, body black-spotted, much paler quills grey-barred.

**278c Pale adult female** Larger; more chestnut head, more spotted back.

**278d Adult female** (*aldabranus*, Aldabra) Smaller; variable but usually paler; below, more lightly marked, sometimes almost plain whitish. [Dark morph unknown in this race.]

**278e Juvenile female** (nominate) As c but heavier spots; quills buff-tinged.

Text and map page 848



### 279 Mauritius Kestrel *Falco punctatus*

1.25–29 cm (11 in): S49–56 cm (21 in): T12–15 cm (5 in): ♂85%

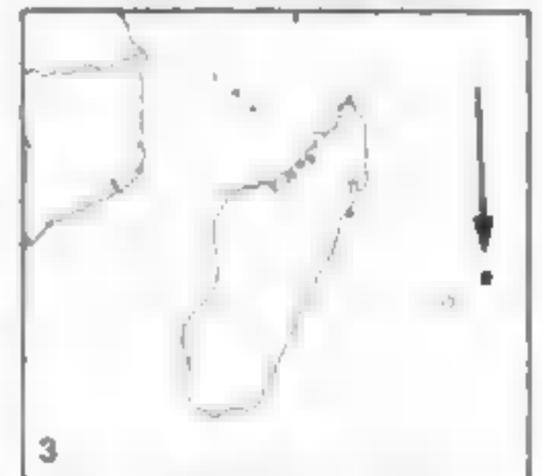
Steep forested gorges, to 800 m. Small thickset falcon; short pointed wings, relatively long tail. Usually still-hunts from hidden perch, flying tree to tree; surprises or chases birds, hops along branches after geckos, hawks insects; also searches low over canopy, sometimes hovers over scrub. Rare, less adaptable to human presence than **278–280**; fewer than 10 left in early 1970s, extinction looming, nests at risk from introduced monkeys; but conservation and captive-breeding had raised total in wild to 75–80 by late 1980s, over 250 by mid 1990s, and 500–800 by 2000.

**279a Adult male** ♂-type plumage, all rufous above with black-streaked head, barred back/wings/tail; whitish below with bold black spots/heart, streaked chest. Flight below (**279ax**): whitish linings streaked/spotted; all quills barred, primaries tipped blackish, secondaries and tail tinged rufous. Above (**279ay**): black-barred chestnut; blackish hands.

**279b Adult female** Indistinguishable in field from a but for larger size.

**279c Juvenile male** Again much as a but paler above, less boldly marked below.

Text and map page 849



### 280 Seychelles Kestrel *Falco araea*

1.20–24 cm (9 in): S44–47 cm (18 in): T11–12 cm (4.5 in): ♂90%

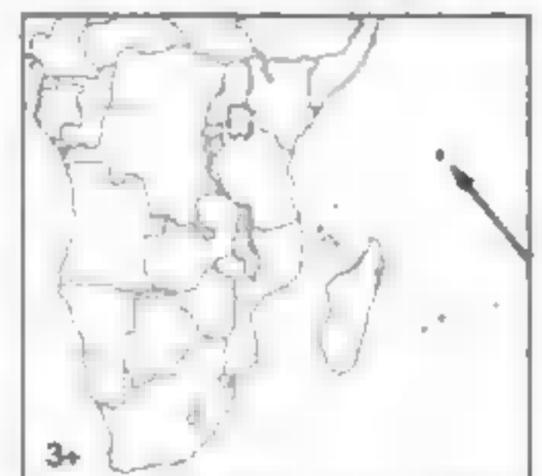
Forest, rocky uplands, more open areas, coconut plantations, gardens, churches, towns, to 900+ m. Very small slim falcon, smallest of genus *Falco*; short pointed wings, medium tail. Fast flickering beats/glides. Perches openly on poles, trees, rocks, buildings; still-hunts lizards on ground or trees. Noisy *ki-ki-ki...* when nesting. [cf. migrant 295/290]

**280a Adult male** Black-spotted chestnut back/wings, dark grey head/rump, short moustaches; grey tail with c4 thin black bars, subterminal band, whitish tip; pinkish-buff below, whiter throat/crissum. (Prey: Seychelles skink *Mabuya seychellensis*.) Flight below (**280ax**): pink-buff body/linings; dark-barred greyish primaries and pink-tinged secondaries; barred tail. Above (**280ay**): grey head/rump/barred tail; chestnut back/wings; dark brown hands.

**280b Adult female** Unusual in having ♂-type plumage; averages larger/paler than a.

**280c Juvenile male** Differs above from a/b in chestnut crown, heavier markings, rufous-tinged/buff-tipped tail; rufous-buff below, sparsely spotted; throat/crissum cream. Flight below (**280cx**): much as ax but for spots, chestnut head, more rufous tail.

Text and map page 851





## PLATE 97: AUSTRALASIAN KESTRELS

### 281 Moluccan Kestrel *Falco moluccensis*

L26–32 cm (11 in): S59–71 cm (26 in): T14–16 cm (6 in): ♂89%

Open country, cultivation, towns, to 2200 m (2800 m). Smallish falcon; long pointed wings, longish rounded tail; wing-tips well short of tail-tip. Flight/behaviour much as 282 (below) and 277, including characteristic hovering/kiting. Ground prey taken in this way or by still-hunting from open perch; also hawks insects on wing. [282 Apr–Sep in Sundas; also 25/297/298]

**281a Adult male** (nominate; Moluccas) Chestnut above, thin black streaks on head, spots on back/wings; blackish primaries; grey tail, black subterminal band, whitish tip; slightly paler chestnut below, streaked/spotted black, throat/thighs/crissum plainer. Hovering below (**281ax**): whitish to cream wings much paler than body, with black-spotted linings, grey-barred remiges and rufous-tinged secondaries; grey tail, black subterminal.

**281b Adult male** (*microbalia*; Sulawesi/Lesser Sundas from Lombok to Alor) Paler; greyer cheeks. [Also whiter wing-linings in flight.]

**281c Adult male** (*timorensis*; Timor to Tanimbar) Paler still. Flight below (**281cx**): less marked than **ax**; linings whiter than shown here.

**281d Adult male** (*javensis*; Java/Bali/Kangean: flight above) Much as **b**; all races above have chestnut head/body/inner wings, spotted and streaked; blackish hands; grey tail and subterminal band.

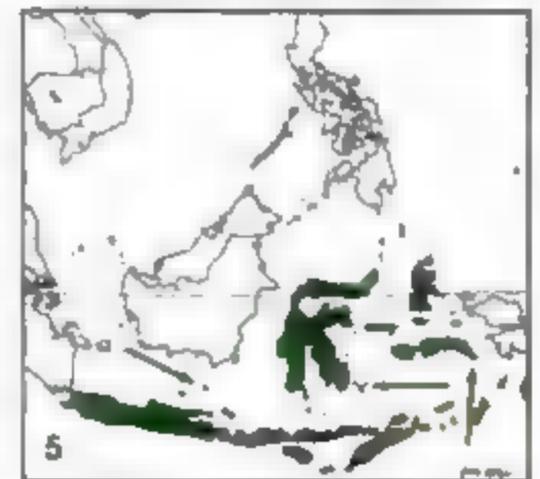
**281e Adult female** (nominate) ♀s like heavily marked ♂s, but more barred above, more streaked and arrowheaded below; tail grey, but c8 often broken or incomplete bars as well as subterminal band.

**281f Adult female** (*javensis*) Flight below. Much as **cx** but for tail-bars.

**281g Juvenile female** (*microbalia*) Juveniles resemble ♀s, but are darker and still more heavily marked; 6–7 coarser bars on rufous-tinged tail.

**281h Juvenile female** (*javensis*) Flight below. As **f**, but linings more buff.

Text and map page 852



### 282 Australian Kestrel *Falco cenchroides*

L28–35 cm (12 in): S66–78 cm (28 in): T14–16 cm (6 in): ♂84%

Open country in Australia, especially farmland with scattered trees, also towns, to 2,000 m; some winter in grassland, savannah and airfields in New Guinea; another race sedentary in New Guinea mountains, at 3,200–3,800 m. Smallish slim falcon; long narrow wings, longish rounded tail; wing-tips reach subterminal tail-band. Fast winnowing beats; sweeping glides on flat wings. Characteristic hovering with fast beats, or hanging on wind with motionless wings flexed above back; dives steeply on to ground prey. Perches openly on dead trees, poles, wires or buildings. Solitary/loosely gregarious. Obviously closely related in both form and behaviour to 277/281/282. [cf. 26/27/ed274a; 281 Apr–Sep in E. Sundas]

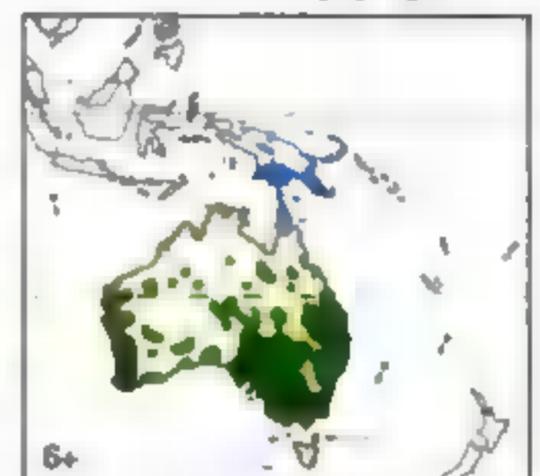
**282a Adult male** (nominate; Australia/Tasmania, some winter S New Guinea/E. Sundas) Pale rufous-chestnut above, sparsely black-spotted only on scapulars/greater coverts; grey crown finely streaked, whiter cheeks, thin moustaches; grey rump/tail, subterminal black band, whitish tip; blackish primaries; cream below, more rufous-buff on chest/flanks, with dark shaft-streaks. Flight below (**282ax**): all whitish but for few fine streaks, faintly barred remiges and subterminal tail-band. Above (**282ay**): pale chestnut with grey head and black-ended tail, blackish hands.

**282b Adult male** (*baric*; Snow Mts of New Guinea) Slightly larger than **a**; darker grey head/tail. (Prey: Blue-faced Finch *Erythrura trichroa*.)

**282c Adult female** (nominate) All rufous-chestnut above, or rump may be grey and head/tail washed grey; tends to be more spotted above and streaked below than **a**, and tail often barred, but usually much less marked than most ♀ kestrels (extreme example shown and some much more like **a**). Flight below (**282cx**): much as **ax**, but rather more body-streaks, tendency to bars on tail. Above (**282cy**): resembles **ay** but for rufous head/tail, some barring.

**282d Juvenile female** Much as **c**; tends to be more strongly streaked and spotted above, with clearer tail-bars, and more buff and broadly streaked below.

Text and map page 854





Philip Eason

© 2011 Philip Eason

## PLATE 98: AMERICAN KESTREL

### 276 American Kestrel *Falco sparverius*

L21–27 cm (9 in): S52–61 cm (22 in): T11–15 cm (5 in): ♂90%

Widespread except beyond arctic treeline (not tundra) and in Amazonia (not dense forest), to 4,300 m; so habitats similar to 277 in Old World, but also more in towns and cities. Small compact falcon; pointed wings, rounded tail (neither particularly long); wing-tips well short of tail-tip. Light buoyant beats, faster and shallower in pursuit; glides on flat wings, or wrists thrust down and tips upcurved; soars flat, tail often fanned. Hovers with rapid beats, or hangs motionless in air, almost as habitually as 277/281/282. Perches erect on bare trees, posts, wires, and buildings. Solitary; gregarious on migration/at food abundances. [cf. Nea 294; Neo 299/23]

Text and map page 838



- 276a Adult male** (nominate; most N America) Blue-grey crown with central rufous patch (variable, may be absent); white throat/cheeks with 2 distinctive vertical stripes each side; black 'false eye' at each side of rufous nape (protective pattern against predators?); rufous upperparts lightly barred on back/scapulars; blue-grey wing-coverts with smaller spots of black; usually rufous tail (sometimes dull brown or grey-brown, but varying white to black) with broad black subterminal band (sometimes additional bands of black and grey-white), also variable white, grey or rufous tip, and black-banded white outermost feathers; cream to rufous below with black spots/blotches on lower breast/flanks. Hovering below (**276ax**): buff-white wing-linings spotted black, remiges banded dark grey, but wings usually paler than body; rufous tail with black subterminal band; white spots near tips of remiges show up against strong light. Flight above (**276ay**): combination of rufous body and tail (tipped black and white), blue forewings, and blackish remiges (again showing white spots at times). Breaking into nest of Cliff Swallows *Hirundo pyrrhonota* (**276az**): commoner prey insects, reptiles, mammals.
- 276b Adult male** (*paulus*; Florida to S Alabama/S Carolina) Averages smaller; richer colours; fewer spots/bars above, few or no spots below.
- 276c Adult male** (*peninsularis*; NW Mexico to S Baja California) Size as **b**; paler; vertical cheek-stripes reduced; some spots below.
- 276d Pale adult male** (*sparveroides*; S Bahamas/Cuba/Jamaica) Size again as **b**; plain and rather pale above; vertical cheek-stripes narrow; strikingly white below but for rufous tinge to chest-sides.
- 276e Dark adult male** (*sparveroides*) Much darker; white cheeks reduced; blue-slate above, including mantle, and plain rich rufous below.
- 276f Adult male** (*uchraceus*; NW Venezuela/E Colombia) Larger again; few black markings; breast orange-cinnamon, belly/thighs paler.
- 276g Adult male** (*isabellinus*; E Venezuela/N Brazil) Paler; some spotting.
- 276h Adult male** (*cinnamominus*; SE Peru/Bolivia/Paraguay/Uruguay S to Tierra del Fuego) Largest race; paler, dull rufous to buff; more barred on back, well spotted on wing-coverts, blotched on flanks; often more black-and-white banding on outer tail.
- 276i Adult female** (nominate) Head much as **a**, though paler, less blue, more streaked; otherwise all more or less red-brown above, barred dark brown, including wing-coverts and tail, latter also with thinner subterminal band; cream below, streaked rufous except crissum. (Prey: grasshopper.) Flight below (**276ix**): linings streaked rufous as body, remiges as **a** but washed rufous, and barred rufous tail all combine in rusty tone. Above (**276iy**): dark-banded rufous body/tail/inner wings, and blackish hands.
- 276j Pale adult female** (*sparveroides*) Narrower cheek-stripes; creamy-white below, with rufous streaks largely confined to breast-sides.
- 276k Dark adult female** (*sparveroides*) Head much as **e** with little white; otherwise all rich rufous, well barred above, streaked below.
- 276l Juvenile male** (nominate) Much as **a**, but crown-patch browner and more streaked, back more barred, underparts paler and breast more streaked; legs paler. [Usually moults to adult in first autumn.]
- 276m Juvenile female** (nominate) As **l**, but often subterminal tail-band hardly wider than other bars, and crown more streaked; legs paler.



## PLATE 99: RED-FOOTED FALCONS

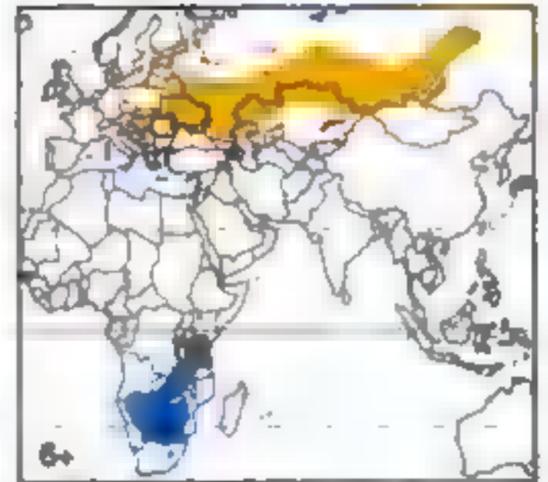
### 289 Western Red-footed Falcon *Falco vespertinus*

L:27–32 cm (12 in): S:66–77 cm (28 in): T:12–14 cm (5 in): ♂98%

Open country with trees, also marshes, riverine woods, forest clearings, to 1,500 m; grassland and low scrub in winter. Smallish slender falcon; thin pointed wings broader-based than 295, squared or rounded tail little longer; wing-tips reach/exceed tail-tip. Loose beats, fast/stiff when hunting; glides on scythe wings as 295; soars on slightly depressed wings, spread tail. Often hovers (less than 277) or still-hunts from wire/post/branch; diet insects, often caught/eaten in agile flight; chicks given vertebrates (a). Often crepuscular. Single pairs in crow nests, colonial in rookeries; flocks migrate up to 11,000 km, large winter roosts. [cf. a291b/292b; cd295c/277f; d292c; Afr 290/285]

- 289a Adult male** Dark slate above, head/tail blacker; slate below, but lower belly/thighs/vent dark rufous; bare parts orange-red. (Prey: spadefoot frog *Pelobates fuscus*.) Flight below (289ax): dark grey body/remiges, black linings/tail; thighs/crissum rufous at close range. Above (289ay): slate with silvery remiges.
- 289b Adult female** Brownish-slate above, barred blackish; paler grey tail with dark bars, black subterminal band and rusty-white tip; rufous head/underbody finely streaked; cream forehead/cheeks, black lores, chestnut moustaches; bare parts orange. Flight below (289bx): buff to rufous linings, sparsely marked, often paler than body; quills barred, subterminal tail-band. Above (289by): black-barréd slate with plain remiges, rusty head.
- 289c Juvenile (male)** Pale-edged above; buff forehead and dark-streaked crown, whitish collar, dark horseshoe by eyes; rufous-washed grey tail barred black, thin subterminal, rufous-white tip; buff below, breast/flanks streaked; bare parts orange-yellow. Flight below (289cx): blackish-streaked rufous-buff linings darker than barred quills and often than body; dark trailing wing-edges. Above (289cy): streaky cap, pale forehead/collar; buff-edged back paler than remiges; rusty-grey barred tail.
- 289d First-summer male** More as a above after incomplete moult in Africa, but rusty hindneck, creamy cheeks, dark moustaches, and juv remiges/wing-coverts/tail-sides; rufous below, then breast slate and variably washed rufous (and thighs/crissum usually all rufous). Flight below (289dx): rufous and slate body; linings more as c; quills as c. Above (289dy): note faint collar, dull remiges, barred tail-sides.
- 289e Second-autumn male** Flight below. Moults again Jun-Dec; much as a by autumn, but mix of adult and worn juvenile remiges/primary coverts; paler breast/tail show blackish moustaches/subterminal band.

Text and map page 864



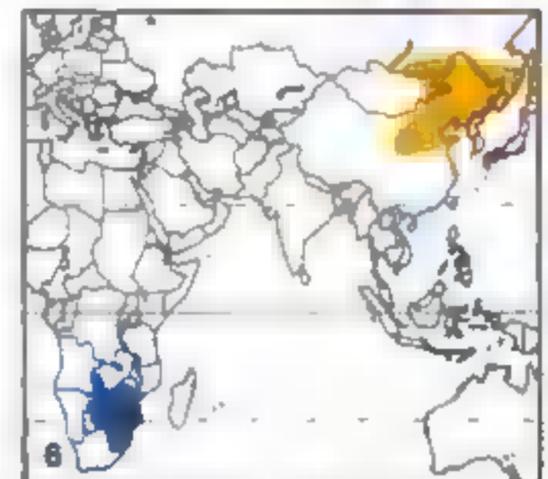
### 290 Eastern Red-footed Falcon *Falco amurensis*

L:26–30 cm (11 in): S:63–71 cm (26 in): T:12–14 cm (5 in): ♂97%

Wooded steppe, riverine/marshy woodland, in N also bogs, to 1,000+ m (to 4,420 m on migration); winters savannah, grassland with trees. Very like 289, if marginally smaller, shorter-winged, longer-tailed; wing-tips just short of tail-tip. Often thought conspecific, but striking plumage differences, disjunct breeding, little winter overlap. Roosts of 5000 common; most nest singly. Migrates c11,000 km to S Africa. [cf. bc295/296/297, and ♀s/juveniles of 275/277; Afr also 289]

- 290a Adult male** Very like 289 at rest, though somewhat darker above and bluer-grey below. Flight below (290ax): white linings against dark grey remiges, blackish tail, and rufous lower abdomen.
- 290b Adult female** More like 295 than 289b; grey above with very obscure barring, but slaty head (forehead should be whitish), black moustaches, black-blotched cream underbody, pale rusty lower abdomen/thighs; bare parts orange-red. Flight below (290bx): dark-blotched white linings paler than body; thinner bars on white tail. [295 has black head, heavy streaks below, dark rufous lower abdomen, darker tail, yellow bare parts.] Above (290by): as 289by but dark head/moustaches, paler back/wings.
- 290c Juvenile (male)** All grey-brown above, back/wings edged buff/rufous; hint of paler collar, less contrast on head-sides than 289c; tail greyer; cream below, well streaked (cf. 295e); bare parts yellow. Flight below (290cx): as bx but more streaked.

Text and map page 867





## PLATE 100: ELEONORA'S AND SOOTY FALCONS

### 291 Eleonora's Falcon *Falco eleonorae*

L36–42 cm (15 in): S84–103 cm (37 in): T16–20 cm (7 in): ♂84%

Island cliffs, hunting coastal marshes, lakes, woods; winters wetlands, forest, uplands, to 2,000 m (3,000 m). Largish slender falcon; long narrow wings, longish rounded tail; wing-tips crossed over tail-tip. Slow shallow beats, still relatively slow but deeper in pursuit; glides/soars on flat or slightly depressed wings, tail closed or part-open in soaring; kites. Stoops at birds, hunts insects with mix of flapping, gliding, soaring. Gregarious/colonial. [ad292c/295/309j; bce289a/292ab]

- 291a Pale adult (male)** Blackish-slate above; cream area behind blackish moustaches; cream/buff throat obscurely shaft-streaked; buff to rufous below [some suffused sooty, which possibly 1-summer plumage], heavily streaked blackish, crissum usually plain; ♂ cere and orbital rings yellow, ♀ blue (see b/c). Flight below (**291ax**; ♂): creamy throat, streaked body, plain crissum; dark-tipped greyish tail barred rufous; dark brown linings, dusky remiges paler-based. Above, chasing Common Swift *Apus apus* (**291ay**; ♀): all dark, tail just paler. Party hawking insects (**291az**).
- 291b Dark adult male** All dark brownish-slate, but throat often washed cream, lower underparts sometimes tinged rufous; cere and orbital rings yellow. Flight below (**291bx**): all dark; linings blackest, quills little paler, esp towards bases of remiges.
- 291c Dark adult female** Usually slightly browner; cere and orbital rings clear pale blue. Flight above (**291cx**): all dark, looking black.
- 291d Juvenile (male)** Both morphs as a, but fringed cream to rufous above; buff to rufous below, washed brownish, streaked broadly on breast, more finely on belly/thighs; cere bluish, legs green. Flight below (**291dx**; ♀): linings heavily spotted blackish (all dark at distance); remiges paler than a, obscurely barred, with dark trailing edges; clearer rufous tail-bars. Above (**291dy**; ♂): browner than a, pale-edged; tail barred/tipped rufous.
- 291e Dark first-summer (female)** As b/c, edged buff to rufous above; belly also edged rufous, crissum barred cream and grey; bare parts as d. Flight below (**291ex**; ♂): dark with paler crissum, whitish to rufous barred tail, whitish-mottled remiges. Above (**291ey**; ♂): browner than b/c, edged pale; tail barred/tipped rufous.

Text and map page 869



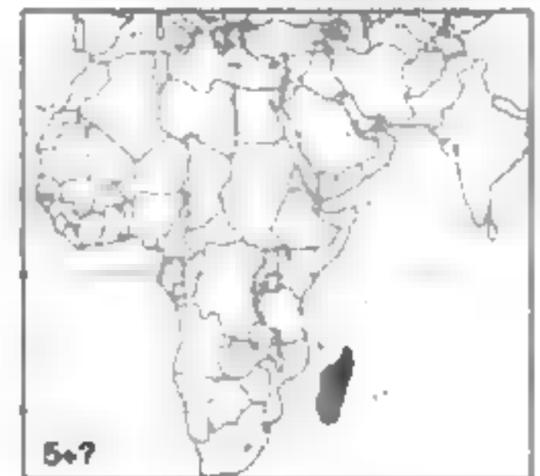
### 292 Sooty Falcon *Falco concolor*

L32–37 cm (14 in): S75–88 cm (32 in): T13–14 cm (5 in): ♂88%

Deserts, hot open lowlands, rocky islands, to c1,000 m; winters esp lakes, rivers, paddyfields, also rainforest, towns, to 2000 m. Mid-sized falcon; shape as larger 291, but shorter wedge-tipped tail; wings crossed over tail, end at or beyond tip. Slowish stiff beats with glides, but in pursuit beats fast and strong as 309; glides flat; soars on slightly lowered wings angled at wrist. Like 291, insectivorous, feeds young on birds. Crepuscular. [ab291bc/289a, in Afr 285/290a; e289c/291ad/295, in Afr 290c]

- 292a Adult male** All blue-grey with blacker lores and primaries, grever tail, usually faint black moustaches, sometimes pale throat; bare parts orange-yellow. (Prey: European Bee-eater *Merops apiaster*.) Flight below (**292ax**): grey; dark wing/tail-tips.
- 292b Adult female** Flight above. All blackish primaries and dark tail-tip same as a; otherwise darker sooty-grey contrasting blue rump; usually pale throat, no moustaches; bare parts lemon-yellow.
- 292c Juvenile** Browner-grey above, edged whitish to buff; dusky hood, moustaches and aural wedges contrast cream-buff throat/lower cheeks; buff to yellowish-brown below, variably streaked brown-grey, breast blotched and washed slate; cere/orbital rings bluish, legs pale yellow. Flight below (**292cx**): buff throat; streaked body darkest on breast (some paler than others); linings as breast but more barred; dusky remiges, paler-barred bases; thin tail-bars, wider subterminal. Above (**292cy**): brown-slate with grever tail, darker primaries, all edged whitish-buff.
- 292d First-summer** Flight below. Darker/sootier than b, much darker than a, but with barred juvenile remiges/tail. (This plumage may be origin of claims of dark morph, now not substantiated.)

Text and map page 872





Philip Burton

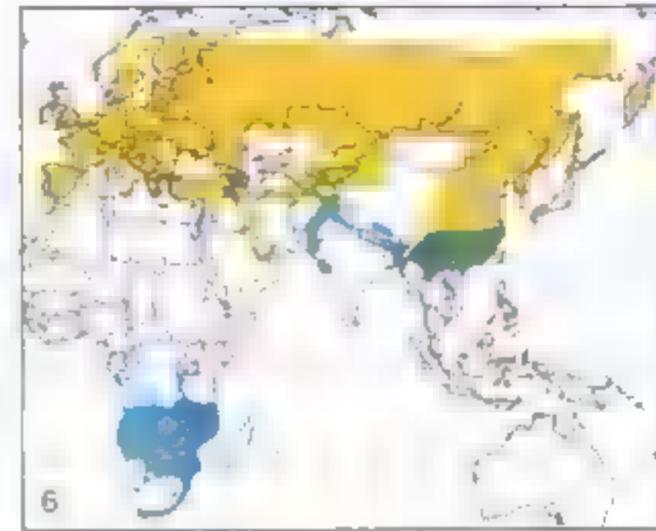
## PLATE 101: NORTHERN, AFRICAN AND ORIENTAL HOBBIES

### 295 Northern Hobby *Falco subbuteo*

Text and map page 881

L28–34 cm (12 in): S68–84 cm (30 in): T12–15 cm (5 in): ♂88%

Open woodland, heath/steppe/farmland with trees, locally towns, to 3,000 m, but 4,000 m in Himalayas; winters savannah, farmland, woodland, often near water, also suburbs. Slim smallish falcon; thin pointed scythe-like wings (♀ broader-based), squared/wedge-tipped tail; wing-tips reach tail-tip. Stiff shallow beats, deeper and faster in pursuit; glides on flat wings angled back; soars on outstretched wings flat or slightly depressed, tail spread; rarely hovers. Chases/stoops at birds; flaps/glides/soars to catch/eat insects in flight. Solitary nester; sometimes groups on migration; feeds/roosts communally in winter. Often crepuscular. [cf. 289cd/290bc/291ad/292c]



- 295a Adult male** (nominate; whole range bar c) Dark slate above, often slightly rufous-tinged nape; blackish head/moustaches aural wedges, short creamy streak over eyes, cream cheeks; buff/rufous-buff below with blackish streaks, heaviest on breast, but thighs/crissum rufous, plain or barely streaked. Flight below (**295ax**): cream throat, well-streaked breast, rusty rear body; whitish to rufous-buff linings barred/spotted dark and dark-barred pale grey remiges give grey-looking underwings; barred tail.
- 295b Paler adult (male)** (nominate) S birds tend to be paler slate above and cream to buff below, but no constant racial differences.
- 295c Adult (male)** (*streichi*; SE China/N Laos) Averages smaller/paler; sedentary.
- 295d Darker adult female** (nominate) Larger; browner by comparison. Flight below (**295dx**): as **ax**, though thighs often more clearly dark-streaked.
- 295e Juvenile (male)** (nominate) Just fledged. Browner above, all edged rufous-buff; thighs/crissum buff or dull rufous-buff (not red); cere bluish, feet green then yellow. (Prev: keeled skimmer *Orthetrum caerulescens*.) Flight below (**295ex**: older ♀): similar to **dx** but belly buff.

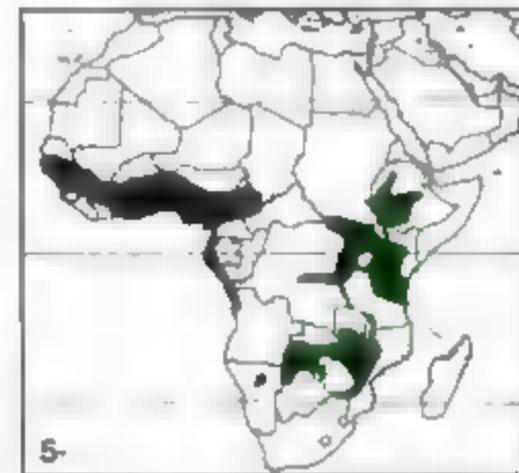
### 296 African Hobby *Falco cuvieri*

Text and map page 885

L26–31 cm (11 in): S60–73 cm (26 in): T11–13 cm (5 in): ♂81%

Open woodland, forest edge, damp savannah, locally suburbs, to 3,000 m. Smallish slim falcon; slightly smaller and shorter-winged than 295. Flight similar; flies fast/low. Little seen; solitary except at insect swarms. [cf. 312; 295]

- 296a Adult (male)** Slaty-black above, darkest on head; black moustaches, rufous-buff cheeks/throat (often few rufous feathers on nape) shading to rich rufous below, breast/flanks finely streaked black. Flight below (**296ax**: ♂): linings as body, all looking plain rufous at distance; greyish quills faintly barred buff to rufous. Above, hawking termites on wing (**296ay**: ♂ and larger ♀): all blackish unless rufous flecks on nape.
- 296b Juvenile (female)** Browner and thinly edged rufous above, more broadly streaked black below; bare parts first greenish, soon yellow. Flight below (**296bx**: ♀): as **ax** but body/linings more broadly streaked.



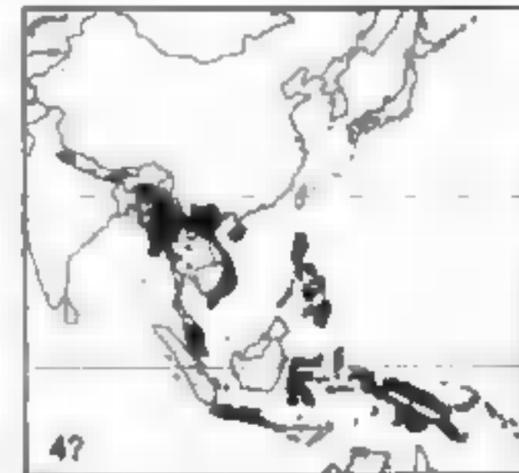
### 297 Oriental Hobby *Falco severus*

Text and map page 886

L24–29 cm (10 in): S61–71 cm (26 in): T9–11 cm (4 in): ♂78%

Forest by cliffs, foothills, to 2,600 m. Slim falcon; big ♀s no larger than small ♂ 295; shorter-tailed. Flight/behaviour similar. Eats more bats; hunts insects socially. [cf. 295/294/290c]

- 297a Adult (male)** (nominate; SE Asia/Sundas) Slaty-black above, blacker head (no moustaches); rich rufous below, throat/neck-side paler, all plain except chest-sides. (Prev: scarabaeid beetle *Potosia*.) Flight below (**297ax**: ♂): linings as body, but often some streaks; quills mainly grey, barred rufous on primaries/tail. Above (**297ay**: ♀): all black. (Chasing vesper bat *Myotis*.)
- 297b Adult (male)** (*papuanus*; Sulawesi to Solomons) Small; blacker above.
- 297c Juvenile (female)** (Dark brown above, edged paler; boldly streaked blackish below; bare parts bluish, soon yellow. Flight below (**297cx**: ♀): as **ax** but boldly marked. Above (**297cy**: ♂): all blackish.





295c

295a

295a1

295c

295d1

295b

295d

295a

296a1

296a

296b1

296a1

296b

297a1

297b

297c1

297a1

297c

297c1

297a

## PLATE 102: SMALLER AUSTRALIAN FALCONS

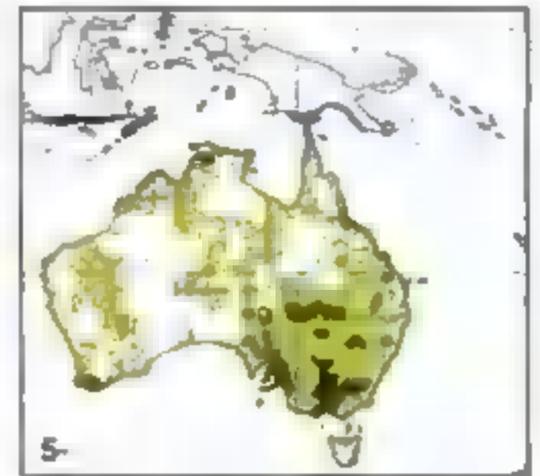
### 298 Australian Hobby *Falco longipennis*

129–35 cm (13 in); S66–83 cm (29 in); T13–15 cm (6 in); ♂76%

Open woodland, riverine trees, timbered suburbs, semi-desert, to 1,000 m (2,000 m). Smallish slim falcon; long pointed wings, fairly long squared tail; wing-tips reach or exceed tail-tip. Larger than 296, 297, size as 295. Flat stiff beats, or dashing/flickering in pursuit when often low fast chases over or among trees or open ground; glides on flat or drooped wings with tips backswept; soars on outstretched flat wings turned slightly back at carpal, trailing edges curved. Attacks birds; bats with series of short stoops and towering upwings; eats insects or other small prey on wing or on high perch. Often crepuscular. Solitary. [cf. 309hir/282; b300]

- 298a Adult (male)** (nominate; Tasmania/humid S Australia) Dark slate-grey above; paler rump, fine-banded tail; sooty-black helmet extending into short broad moustaches, cream to buff forehead; throat/half-collar; rich rufous below, breast streaked, flanks blotchy; cere and eye-rings pale grey to yellow. Flight below (**298ax**: ♂): rufous linings streaked as breast; grey quills barred rufous. Above (**298ay**: ♀): dark slate; blacker primaries, barred tail.
- 298b Adult (male)** (*murchisonianus*; dry inland/N Australia) Paler blue-slate above; dull blackish head, cream to buff throat; half-collar; buff to pale rufous below, chest narrowly streaked, flanks spotted/banded. Flight below (**298bx**: ♂): buff linings finely streaked as body; quills much as **ax**, though paler bars. Above (**298by**: ♀): paler grey with blackish primaries, barred tail. (Prey: White-breasted Wood-swallow *Artamus leucorhynchus*.)
- 298c Juvenile (female)** (nominate) Dark brownish-black above, edged rufous; head suffused buffish-rufous, tail barred rufous; rich rufous below, chest/flanks dark-streaked, but thighs/belly/crissum paler and plain; cere and eye-rings pale blue, feet paler yellow. Flight below (**298cx**: ♀): much as **ax**, but body/linings more thinly streaked. Above (**298cy**: ♂): browner than **ay**, with similarly barred tail.
- 298d Juvenile (female)** (*murchisonianus*) Much as **c**; duller brown above, similarly edged/banded rufous; crown more rufous; buff throat/chest shading to rufous breast, chest/flanks thin-streaked. Flight below (**298dx**: ♀): plainer body than **bx/cx**; streaked linings, barred quills. Above (**298dy**: ♂): as **cy** but head more rufous.

Text and map page 888



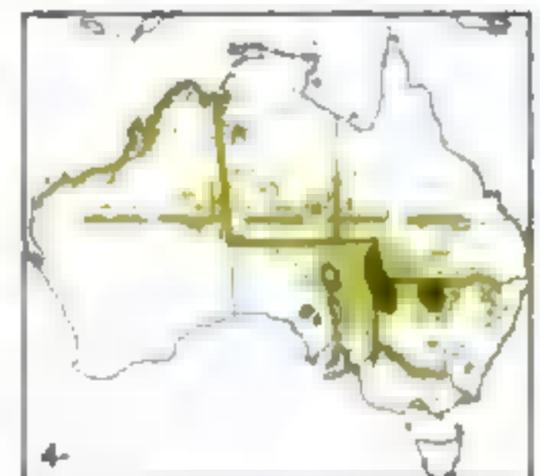
### 300 Grey Falcon *Falco hypoleucos*

L33–43 cm (15 in); S81–103 cm (36 in); T14–19 cm (6 in); ♂66%

Semi-desert, grassland, scrub, riverine trees in arid zone, sometimes more humid open areas, to 1,000 m. Mid-sized stocky falcon; long rather pointed wings, short tail, short legs; wing-tips of ♂ reach tail-tip, of ♀ fall short. High sexual size dimorphism. Shallow winnowing beats, faster and deeper in zigzag pursuit; glides on flat wings; soars with wings pressed rather stiffly forward, slightly rounded tips upswept. Eats mainly birds; stoops from height, often takes prey on ground. Solitary; or often family groups. [cf. 302/309hi/298b/274a/282; less so 26/27/120/119]

- 300a Adult (female)** All blue-grey above and white to palest grey below, with faint black shaft-streaks; obscure moustaches; blackish primaries; grey tail line-banded, broader darker subterminal band; bare parts orange-yellow. (Prey: Galah *Cacatua roseicapilla*.) Flight below (**300ax**: ♂): linings white to palest grey as body; remiges faintly mottled and dark-tipped, tail obscurely barred. Above (**300ay**: ♀): plain grey with dusky remiges, dimly barred tail.
- 300b Juvenile (male)** Slightly darker grey above, edged pale brown, with clearer shaft-streaks; finely barred tail much as **a**; clearer moustaches; white below, streaks on breast, drops on flanks; cere and eye-rings blue-grey, feet dull yellow. Flight below (**300bx**: ♀): white linings streaked/spotted as body; remiges more clearly barred than **a**. Above (**300by**: ♂): mottled grey; less contrast with primaries/tail. (Prey: skink *Egernia*.)

Text and map page 892





## PLATE 103: LARGER AUSTRALASIAN FALCONS

### 302 Black Falcon *Falco subniger*

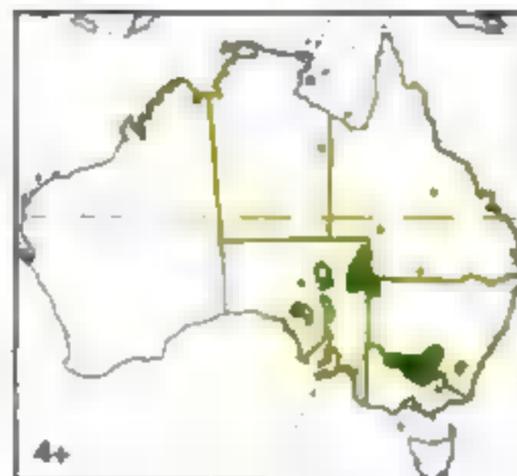
L45–56 cm (20 in): S96–114 cm (41 in): T21–25 cm (9 in): ♂76%

Sparse woodland, scrub, plains, esp in arid interior, to 1,000 m. Large sleek falcon; size as 309, but broader wings/squared tail both longer; small head, short legs/big feet; wing-tips near tail-tip. Short stiff winnowing beats or slower, looser, more crow-like; rapid thrashing in pursuit; soars/glides on slightly drooped wings, wrists forward, rear edges straight, tail usually closed. Soars much, often over shooters, farm machinery, livestock, fires, or foraging harriers [91/101]; stoops, levels out to chase birds or snatch prey from ground; also pirates raptors. Mostly silent. Solitary. [cf. 274c/300/309]

**302a Adult (male)** Sooty-black to dark brown, with or without grey bloom; often buff forehead or cheeks, white chin; sometimes speckles on breast, faint bars on crissum; cere/eye-rings pale blue-grey, feet pale grey. Flight below (**302ax**: ♂): slightly two-tone wings with remiges marginally paler; sometimes few pale spots on linings, faint thin bars on quills. Above (**302ay**: ♂): uniformly dark.

**302b Juvenile (female)** Usually darker, esp against own parents; pale-edged mantle; sometimes pale markings as a; feet blue-grey. Not distinguishable in flight (**302bx/y**: ♀) except by complete remiges and tail in November–March (when a in quill moult). (Prey: Red-kneed Dotterel *Charadrius cinctus*.)

Text and map page 895

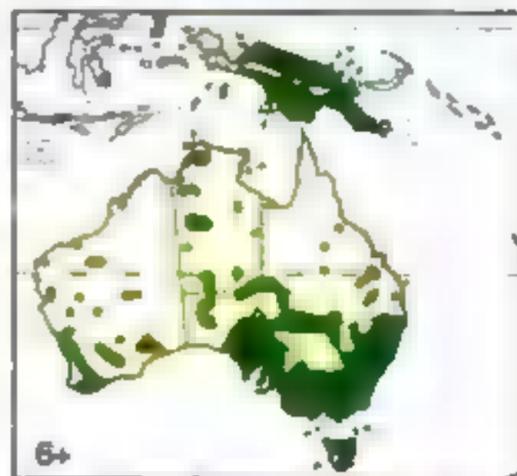


### 274 Brown Falcon *Falco berigora*

L41–51 cm (18 in): S88–115 cm (40 in): T21–23 cm (9 in): ♂75%

Widespread Australia except dense forest, to 2,000 m; scarce lowland New Guinea, more in mountain valleys to 3,000 m. Largish scruffy falcon, round-shouldered and pot-bellied; blunt-tipped wings, rounded tail, big head, long legs/small feet; wing-tips equal to well short of tail-tip. Slow heavy beats with rowing action, often erratic jinking; in pursuit, shorter stiffer deep beats on backswept wings, jerky and erratic, not flickering like most falcons; glides in shallow V; soars with tips upswept or full dihedral, curved rear edges, often fanned tail. Hovers or kites; and still-hunts, often from man-made structures; will run after insects/lizards; chases birds into cover, pirates raptors, eats carrion. Solitary, or loosely gregarious in local movements or at food sources (e.g. mouse/insect plagues or where fires/tractors disturb prey). Raucous crowing cackles, chatters, screeches. Polymorphic and ratios vary geographically; only paler juveniles distinguishable, except when ads in quill moult October–February. [cf. a282/b156/e302]

Text and map page 832



**274a Brown adult (male)** (sole morph; Tasmania/predominant SE Australia and New Guinea) Brown above, spotted rufous; tail barred rufous; whitish/grey forehead/face/supercilia and dark moustaches/ear-coverts; white below, shaft-streaks on breast, brown or brown-spotted flanks, brown thighs; or brown or mottled breast/flanks (♂s may tend to be whiter below); bare parts pale grey (or rarely dull yellow). Flight below (**274ax**: ♀): white linings variably marked brown; lightly barred remiges, dark wing-tips; barred tail tipped whitish. (Prey: juvenile rabbit *Oryctolagus cuniculus*.) Above (**274ay**: ♀): dark brown, tinged rufous by spots/bars.

**274b Rufous adult (male)** (commonest inland/W Australia) Variable as a, but redder-brown above, rufous below, pale face rufous-buff.

**274c Dark adult (female)** (commonest N Australia) All black-brown; sometimes obscure moustaches/check-patches; indistinct rufous tail-bars; indistinct rufous spots on flanks, sometimes bars on crissum. Arid interior adult (**274cx**: ♀): not so dark; clearer moustaches/tail-bars. Flight below (**274cy**: ♀): linings as body; quills paler/barred. Above (**274cz**: ♀): all dark, quills obscurely notched/barred rufous.

**274d Rufous juvenile (male)** Mainly dark brown, edged/mottled rufous; head as a/b but face rufous; still rufous tail-bars; bare parts as a. (Prey: tenebrionid beetle *Helorus colossus*.) Flight below (**274dx**: ♂): mainly dark brown body/linings, variably mottled on mid-breast/belly/crissum; dark-barred buff quills. [Brown juveniles similar, but pale face and mottling below more cream to buff, and usually broad buff collar. Dark juveniles much as c.]



## PLATE 104: NEW ZEALAND AND RED-HEADED FALCONS

### 301 New Zealand Falcon *Falco novaeseelandiae*

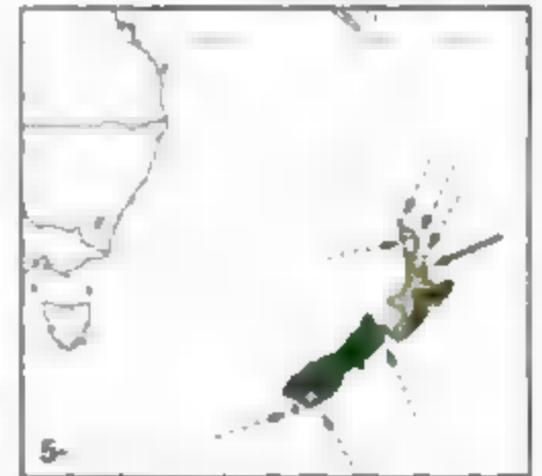
L36–48 cm (16 in): S66–91 cm (31 in): T16–23 cm (8 in): ♂64%

Forest and dense bush, but now more in open tussock grassland, pasture and light scrub in sheep-farming country, to 1500 m (2100 m). Powerful falcon of variable size (because of marked sexual dimorphism and forest birds being smaller than those in grassland); shortish rounded wings, longish tail; wing-tips well short of tail-tip. Fast powerful beats, faster and deeper in pursuit; glides/soars on flat wings; kites but does not hover. Still-hunts; also hunts from high-circling or, less often, like accipiter, flying low, weaving among trees; preys by direct flight mainly on introduced birds, rabbits, rats and mice; forest populations more on indigenous birds. Solitary. [10] only other regular raptor; vagrant 282]

**301a Adult male** Blue-black above, very thinly barred rufous to whitish; greyish bands on tail; broad black moustaches, slight rufous eyebrows, dark-streaked rufous cheeks/throat; cream to buff below, thighs/crissum rufous, all streaked dark brown, flanks well barred. (Prey Saddleback *Creadion carunculatus*.) [Larger ♀ dull black above, sometimes no pale bars; bolder markings below.] Flight below (**301ax**): streaked body, rufous thighs; pale buff linings dark-barréd as flanks [not as shown]; quills boldly barred dark brown and whitish. Above (**301ay**): all blackish with pale bars; solid dark wing-ends. (Prey house mouse *Mus musculus*.)

**301b Dark juvenile (female)** Blackish above; rufous eyebrows/cheek-streaks; dark brown below, mottled rufous; thighs chestnut, flanks pale-spotted; contrasting cream/buff throat; bare parts pale blue to grey or olive. Flight below (**301bx**: ♀): dark linings mottled paler; boldly barred quills. Above (**301by**: ♀): all blackish but for faintly barred tail. [Pale juvenile more as a but browner; some (especially ♂s) pale-lined above; no bars on flanks.]

Text and map page 893



### 288 Red-headed Falcon *Falco chicquera*

L28–36 cm (13 in): S55–70 cm (25 in): T12–17 cm (6 in): ♂74%

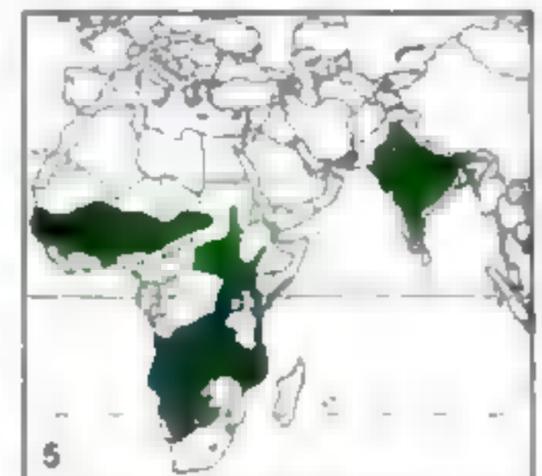
In India, plains, semi-desert scrub, foothills, where trees, cultivation, villages; in tropical Africa, moist tall-grass savannahs, especially among *Bumassus* palms, and locally, as also in S Africa, arid areas with riverine trees, acacia scrub, to 1000 m. Smallish slim falcon; shortish pointed wings, longish tail; wing-tips well short of tail-tip. Fast winnowing beats, deep and regular in pursuit; glides little, soars less, on flat wings or wrists depressed; hovers only momentarily over prey. Bold, dashing, direct; shoots up near-vertically from perch; flushes birds by flying low or into cover. Crepuscular. In pairs. Noisy only at nest.

**288a Adult (male)** (nominate; India) Blue-grey above, faintly barred black on wings; faint black tail-bars, wide subterminal band, white tip; rufous cap; hindneck, darker moustaches; white cheeks to throat, often rufous-tinged chest; white to grey-white below, thinly streaked black on chest, more clearly barred on abdomen. Flight below (**288ax**: ♂): white linings thinly barred black as lower body; grey-white remiges barred brown; greyer tail with bold subterminal band. Above (**288ay**: ♂): grey with contrasting rufous head, and black outer wings and tail-band.

**288b Adult (male)** (*ruficollis*; tropical Africa) More barred above, tail too; blacker moustaches and above/behind eyes; more rufous on chest, more barred below. Flight below (**288bx**: ♀): all well barred; bold subterminal tail-band, rufous chest, black around eyes. Above (**288by**: ♂): as *ay*, but grey areas finely barred.

**288c Juvenile (female)** (*ruficollis*) Darker above than *b*, edged brown, faintly barred blackish; brown crown/nape streaked blackish, 2 buff patches on lower hindneck; white throat; washed rufous below with brown bars, fine streaks. Flight below (**288cx**: ♂): much as *bx*, but barred body/linings washed rufous, especially on breast.

Text and map page 862





## PLATE 105: NEOTROPICAL FALCONS

### 299 Bat Falcon *Falco ruficularis*

L29–30 cm (10 in): S51–67 cm (23 in): T9–12 cm (4 in): ♂61%

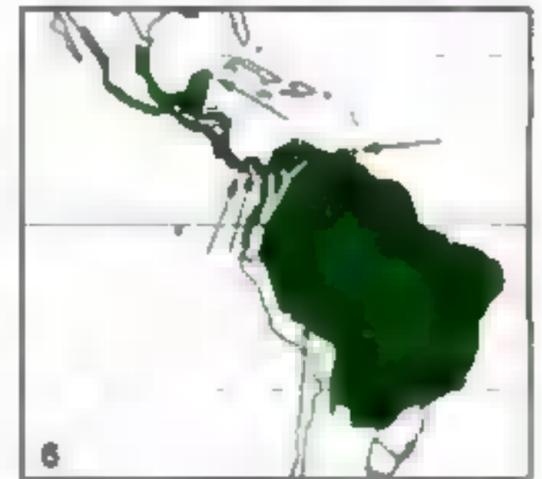
Forest edge/clearings, wooded savannah, urban areas, to 1,700 m. Small sturdy falcon; long thin wings, longish squared tail, small feet; head enlarged by erectile neck/cheek-feathers; wing-tips near/at/just past tail-tip. At distance dark with pale throat, like White-collared Swift *Streptoprocne zonaria*. Stiff flat beats; fast, agile, noisy; crepuscular. Pair often on dead tree by day. [cf. 311/293]

**299a Adult** (*petrophilus*; NW Mexico) Blue-slate above, edged bluer; obscure thin whitish bars on black tail; black head, white to buff throat/chest/part-collar; black T-shirt, indistinct thin white bars at closer ranges; all-rufous lower abdomen/thighs. (Prey: spear-nosed bat *Artibeus*.)

**299b Adult** (nominate; rest of range) Blacker above, edged blue-grey; throat/collar more buff (even orange on upper chest). Flight below (**299bx**): black head, pale throat; finely white-banded black wings/breast/tail, rufous belly. Above (**299by**): black; pale part-collar; obscurely white-tipped secondaries, thin-banded tail.

**299c Juvenile** (nominate) As **b** above but no bluish edges; throat/collar and bars below more buff to rufous [chest often shaft-streaked]; thighs/crissum paler rufous, spotted/banded black. Flight below (**299cx**): much as **bx** but more rufous tone, dark-spotted crissum.

Text and map page 889



### 311 Orange-breasted Falcon *Falco deiroleucus*

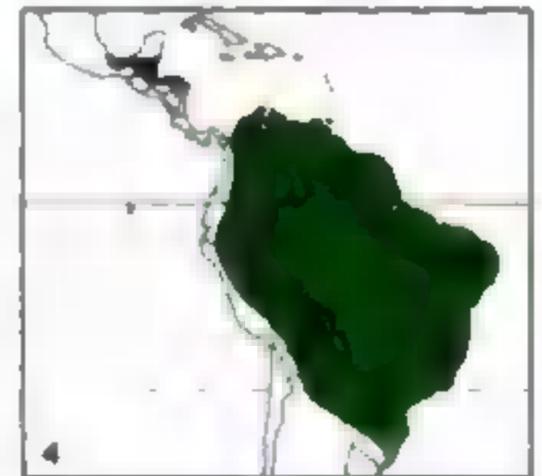
L33–40 cm (14 in): S69–85 cm (30 in): T11–15 cm (5 in): ♂66%

Forest, especially with cliffs, in S also dry thorn-scrub/woods, to 2,400+ m. Mid-sized powerful falcon; much as smaller and far commoner **299**, but shorter wider-based wings, shorter tail, big feet, heavy bill; ♂ head chunky, ♀ longer/thinner; wing-tips reach or exceed tail-tip. Behaviour similar to **299**, but character more like ♂ **309** than big swift. [cf. 299/293/309]

**311a Adult** Blackish-slate above, edged blue-grey; 3–4 thin white tail-bars/tip; black head, white throat, orange part-collar and chest-band (in S America sometimes neck-sides/chest apricot, chest also black-streaked), black waistcoat coarsely banded whitish to cinnamon, rufous lower abdomen/thighs, black bars on crissum (cf. **299c**). Flight below (**311ax**): much as **299bx** but whiter throat, usually broader orange chest-band; rufous-banded breast, banded crissum as **299c**. Above (**311ay**): like **299by**. (Prey: Sun Parakeet *Aratinga solstitialis*.)

**311b Juvenile** Browner-black, edged buff; paler rufous to buff below, less clear waistcoat, more streaked chest, banded thighs/belly/crissum. Flight below (**311bx**): whitish throat, streaked/banded body; wings/tail as **a**.

Text and map page 922



### 293 Aplomado Falcon *Falco femoralis*

L35–45 cm (16 in): S76–102 cm (35 in): T14–21 cm (7 in): ♂72%

Grassland, savannah, to 4600 m. Mid-sized slim falcon; narrow wings, longish tail; wing-tips well short of tail-tip. Slow buoyant beats, faster in hunt; glides/soars on flat wings, or wrists depressed/tips upcurved. Hunts from perch/low flight; often co-operatively in pairs; hovers. [cf. 311/299/309]

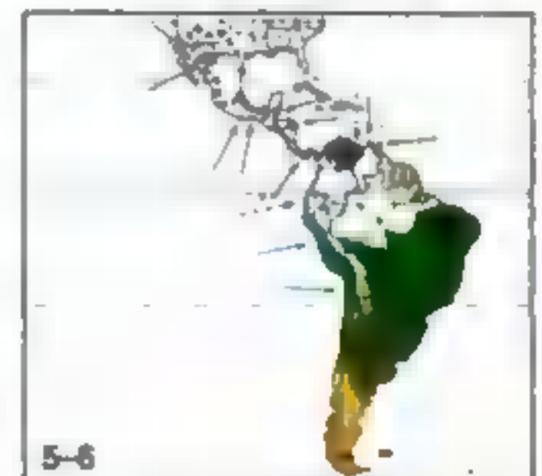
**293a Adult** (*septentrionalis*; C America) Blue-slate above; black tail, 5+ thin white bars; cream cheeks/supercilia into V on nape, black eye-bands/moustaches; cream/buff breast shaft-streaked (esp ♀s); white-edged black cummerbund; rufous below. (Prey: Ground Dove *Columbina passerina*.) Flight below (**293ax**): pale chest, dark cummerbund, rufous thighs/belly/crissum; dark wings fine-banded, white trailing edges; banded tail. Above (**293ay**): grey; white trailing wing-edges, white-banded rump/tail, V on nape.

**293b Adult** (*pichincae*; temperate Andes) Darker; breast more rufous and streaked, abdomen richer rufous; mid-cummerbund broken.

**293c Adult** (nominate; rest of S America) Smaller; duller above, crown blacker, supercilia buff; cummerbund narrowed but not broken.

**293d Juvenile** Much duller/browner above, edged cinnamon; thin buff tail-bands; more buff below, breast heavy-streaked, more solid browner cummerbund fringed buff. Flight below (**293dx**) and above (**293dy**): much as **ax/ay**, but more heavily marked breast, obscurely banded tail.

Text and map page 875





## PLATE 107: LANNER AND LAGGAR FALCONS

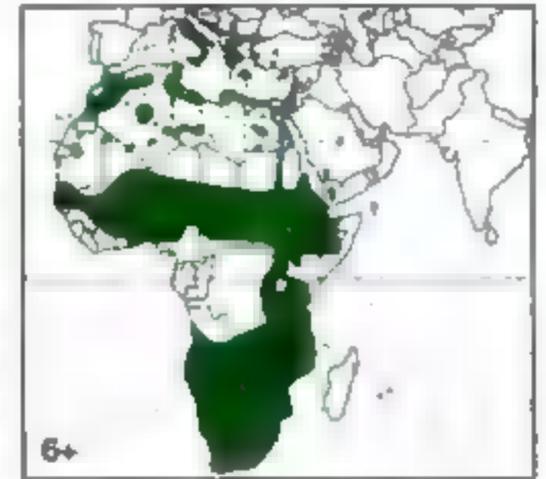
### 305 Lanner Falcon *Falco biarmicus*

L39–48 cm (17 in): S88–113 cm (40 in): T16–21 cm (7 in): ♂76%

Desert, savannah, wooded grassland, forest cliffs, mountains, hunting also over fields/coasts, to 2,500 m, in Africa locally to 5,000 m. Medium falcon; long wings, longish tail; wing-tips often reach or almost reach tail-tip. Slow flat beats, faster/deeper in pursuit; glides/soars on flat or slightly depressed wings. Hunts by surprise, chase, stoop, or even frontal attack (ay); often snatches from ground. Solitary, often in pairs; up to 20 at abundant food (termites, locusts, queleas) or localised supply (waterholes, grass fires). Also crepuscular. [cf. 306/310/309]

- 305a Adult (male)** (nominate (S Africa to S Kenya) Blue-grey above, barred tail; white forehead, rufous crown/nape outlined black, thin moustaches; white below, or pink (esp ♀s?), flanks/thighs spotted. Flight below (**305ax**: ♂): linings as body, any spotting generally invisible; obscurely barred quills. Above (**305ay**: ♀): blue-grey, paler tail narrowly dark-banded; rufous cap, obvious moustaches. (Flying head-on at Common Pratincole (*Glareola pratincola*.)
- 305b Adult (female)** (*abyssinicus*, N Kenya across tropical sub-Saharan Africa) Less even blue-grey above, more barred, edged brown (esp ♀s); chestnut crown; wider tail-subterminal; spots below, tending to bars on flanks/thighs. (Prev: Wahlberg's epauletted fruit-bat *Epomophorus wahlbergi*.)
- 305c Adult (male)** (*erlungeri*, NW Africa) Smaller; palest race [usually much paler than shown]; light brownish-slate and barred above; buff crown thinly streaked or plain; cream below, lightly spotted. Flight below (**305cx**: ♂): whitish, thinly spotted; quills only faintly barred. Above (**305cy**: ♀): pale-edged brown-grey, so primaries much darker; pale crown outlined black; tail-bars rusty-grey.
- 305d Adult (male)** (*feldleggi*, SE Europe/Asia Minor to Azerbaijan) Darkest race; dark slate-brown above, barred/tipped paler to rusty-grey; deep rufous crown all streaked; cream below with dark streaks/drops, buff flanks/trousers more barred. Flight below (**305dx**: ♂): cream to buff linings streaked (especially greater coverts), or sometimes little marked; quills paler as dark bars narrower than on a; thighs/flanks barred. Above (**305dy**: ♀): slate-brown, primaries hardly darker; streaky rufous cap, pale tail-bars.
- 305e Juvenile (female)** (nominate) Dark brown above, edged buff; paler crown, light supercilia, brownish cheeks; plain mid-tail, buff tip; plain throat; cream below, heavy streaks, flanks/thighs blotched; cere green-grey.
- 305f Juvenile (female)** (*feldleggi*) As e, but rufous crown heavily streaked; supercilia white to cream; here relatively lightly streaked below (cf. fx); cere/eye-rings bluish [also feet at first]. Flight below (**305fx**: ♀): pale throat; body and linings (especially greater coverts) may look all dark with pale spots/streaks; quills much paler as ax, but browner bars, darker wing-tips.

Text and map page 899



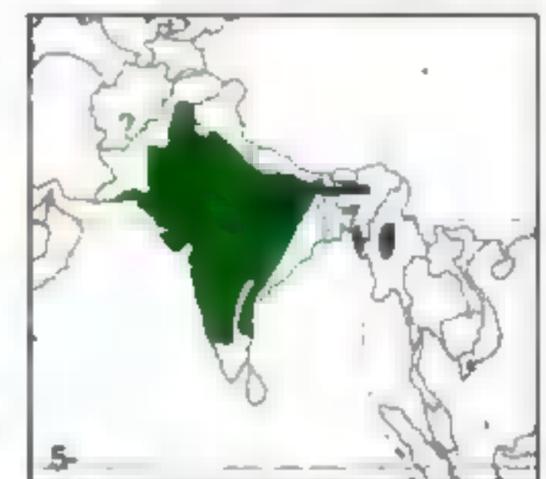
### 304 Laggar Falcon *Falco jugger*

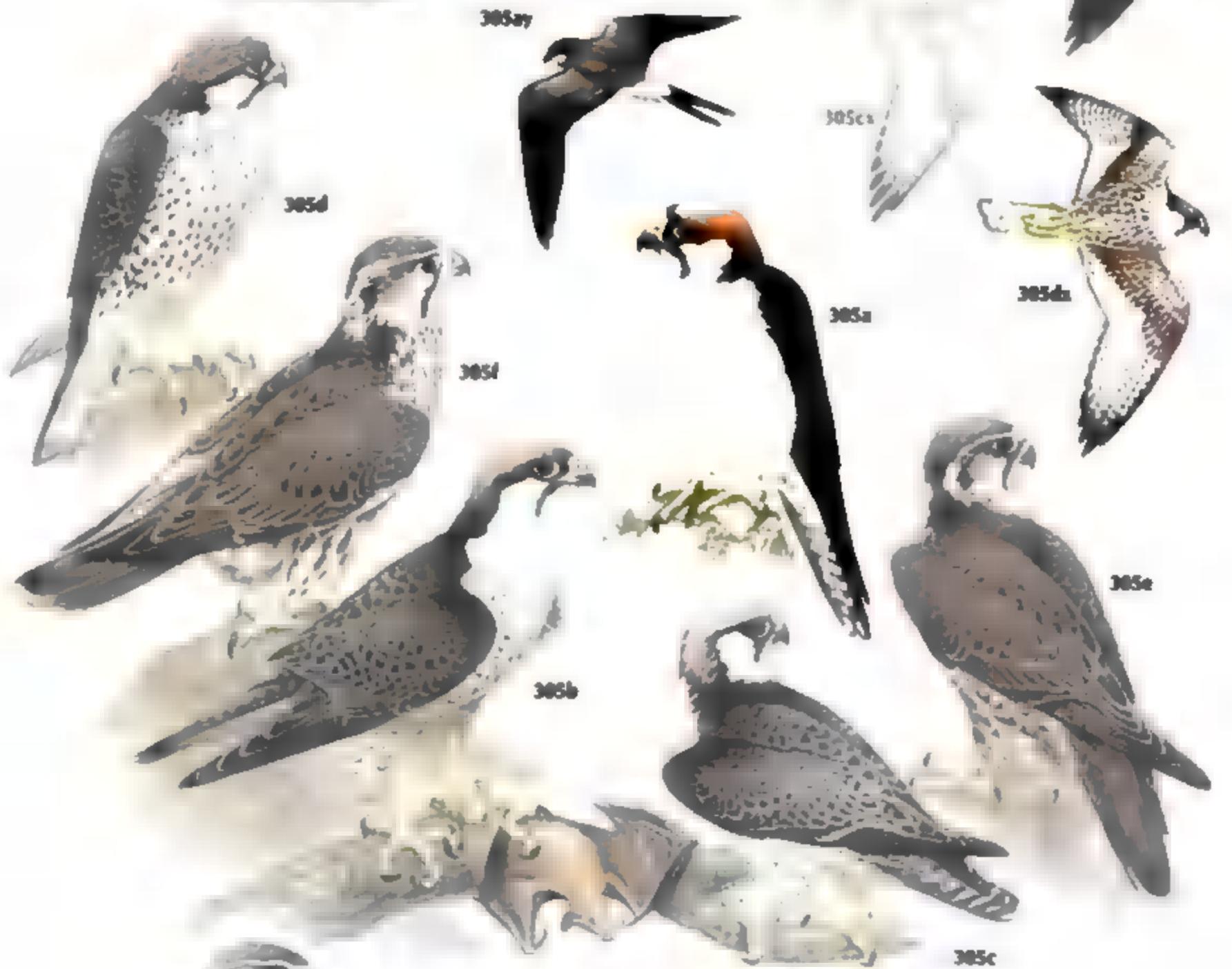
L39–46 cm (17 in): S88–107 cm (38 in): T16–21 cm (7 in): ♂79%

Dry open woodland, scrub, plains, cultivation, semi-desert, wherever some trees, also towns, to 1,000 m (recorded to 1,980 m). Mid-sized falcon; shape as 305, sometimes thought conspecific. Flight/pattern comparable. Seen more on poles, trees, even city buildings. Waits on shooting parties to stoop at flushed/wounded birds. [cf. 306/309/310]

- 304a Adult (male)** Dark brown above, edged paler; plain centre tail, tip buff; rusty-white to rufous crown/nape with black shafts, outlined in white over black eye-stripes/moustaches; whitish to rusty-white below, lightly streaked on chest-sides, more on belly, blotched/banded more solidly on flanks/thighs. Flight below (**304ax**: ♂): whitish throat/chest, streaked abdomen, linings (esp. flanks/greater coverts); dark-banded pale quills. Above (**304ay**: ♀): all dark but for streaky rusty crown, whitish supercilia, buff tail-tip.
- 304b Juvenile (female)** Much as a above, but crown/nape brown; eye-stripes and rear cheeks browner, less clear-cut; except white throat, mainly dark brown below and variably pale-mottled; cere/eye-rings grey-green [also feet at first]. Flight below (**304bx**): mainly dark body/linings contrast white throat, pale-banded quills.

Text and map page 898





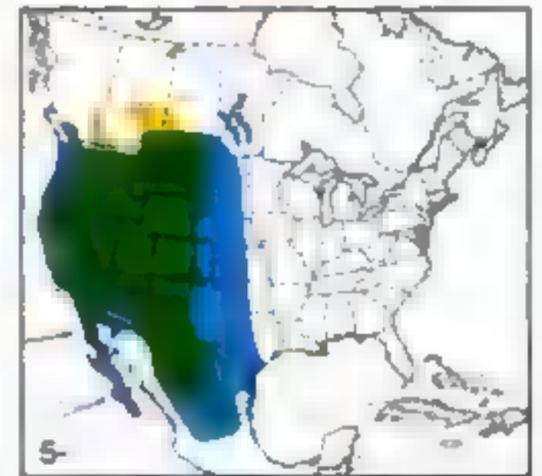
## PLATE 108: PRAIRIE, SAKER AND ALTAI FALCONS

### 303 Prairie Falcon *Falco mexicanus*

L:37–47 cm (17 in); S:91–113 cm (40 in); T:16–20 cm (7 in); ♂72%

Prairies, semi-desert, with bluffs, in foothills, mountains, to 3,700 m; in winter lowland plains, farmland, wetlands. Fairly large falcon; pointed wings, longish tail, squared head, big eyes; wing-tips short of tail-tip [not quite as shown]. Still shallow beats below horizontal; glides on flat wings, or wrists depressed; soars flat, tail somewhat fanned. Surprises mammals on ground with low flight or glide from perch; chases flushed birds; will hover when prey enters cover. Solitary. [cf. 309/294e(♀)/308/193d]

- 303a Adult (male)** Brown above, edged/barréd paler; barréd tail-sides; streaked crown, paler collar, whitish supercilia/strip behind eyes, thin moustaches; whitish below, breast streaked, belly spotted, flanks barréd. Flight below (**303ax**: ♂): looks rather pale apart from dark band on mid-wings, widest on axillaries; relatively lightly marked forewings/body; barréd pale quills. Above (**303ay**: ♀): brown, edged paler; head markings; barréd tail-sides. (Chasing Western Meadowlark *Sturnella neglecta*.)
- 303b Juvenile (female)** Much as a, but lacks pale bars above and more buff and streaked below, so darker; thighs more streaked; bare parts grey at first. Flight below (**303bx**: ♀): buff tone and more heavily streaked, but pattern as ax.



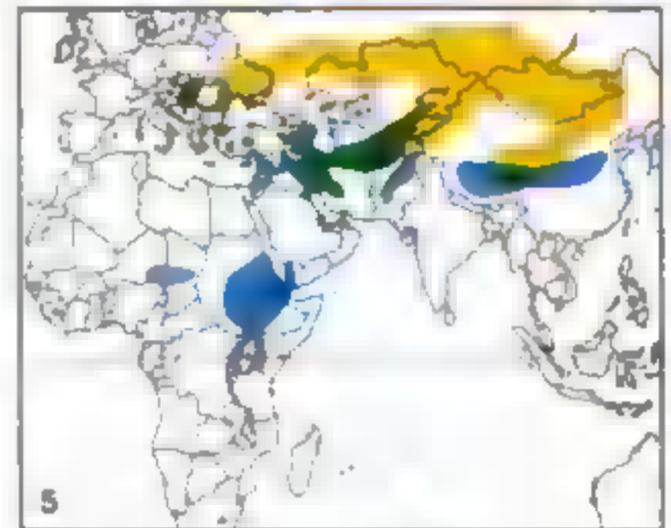
Text and map page 896

### 306 Saker Falcon *Falco cherrug*

L:47–57 cm (20 in); S:97–126 cm (44 in); T:18–24 cm (8 in); ♂72%

Plains to forest-steppe in W, to 2000 m; semi-desert montane plateaux/cliffs in E, at 2,600–4,700 m; winters open grassland to desert; often hunts at wetlands. Large bulky falcon; long broad blunt-tipped wings, longish tail; wing-tips short of tail-tip. Slow shallow beats, but faster/deeper in pursuit; soars/glides on flat or slightly depressed wings; sometimes hovers. Most prey taken on ground, from low flight or perch, but stoops at birds. Solitary/pairs. [cf. 305/307–310]

- 306a Adult (nominate; E. Europe, W. Asia, Siberia, winters to E. Africa/NW India):** Brown to greyer-brown above, edged whitish/rufous; greyer/rustier tail with lateral bars; cream/rufous-tinged head with dusky streaks, whitish supercilia, thin moustaches; creamy below, variably streaked, spotted (cf. b). (Prey: spotted souslik *Citellus suslicus*.) Flight below (**306ax**: 3 ♂s): palest thinly streaked, and faint bars on quills; darkest heavily streaked, esp band on greater coverts, and clearer bars. Above (**306ay**: ♀): pale edges give buff/rufous tone; dark remiges, pale head, lateral tail-bars.
- 306b Adult (mitipes; C. Asia E. S of a, winters to Iran/C. China)** Barréd rufous above, tail too; pinkish-rufous crown/nape streaked dark, clearer moustaches; marked below as variably as a, but flanks/thighs more barréd than streaked.
- 306c Juvenile (female) (both races)** Much as a; darker crown more streaked, clearer moustaches; usually heavier streaks below; bare parts blue-grey. Flight below (**306cx**: ♀): linings almost solidly dark against pale remiges; tail more clearly barréd than ax.



Text and map page 903

### 307 Altai Falcon *Falco altaicus*

L:48–58 cm (21 in); S:100–122 cm (44 in); T:19–24 cm (8 in); ♂70%?

Open plateaux, forest edge, at 1,500–2,750+ m. Big heavy falcon; proportions as 306, 308 and usually considered conspecific with one or other. Flight/behaviour presumably similar, but breeding regime different. [cf. 306, 308]

- 307a Grey adult (male)** Grey to brown-grey above, or more barréd (ax); streaky head, pale supercilia, obscure moustaches; cream below, usually heavily streaked/barréd. Flight below (**307ax**: ♀): much as 306c; rather solidly dark linings, barréd quills. Above (**307ay**: ♂): dark grey; pale supercilia, slight collar.
- 307b Rufous adult (female)** More as 306b, edged and broadly barréd rufous; but darker crown, more rufous tone, clearly barréd tail. [juvenile apparently similar, equally variable; bare parts blue-grey.]



Text and map page 906



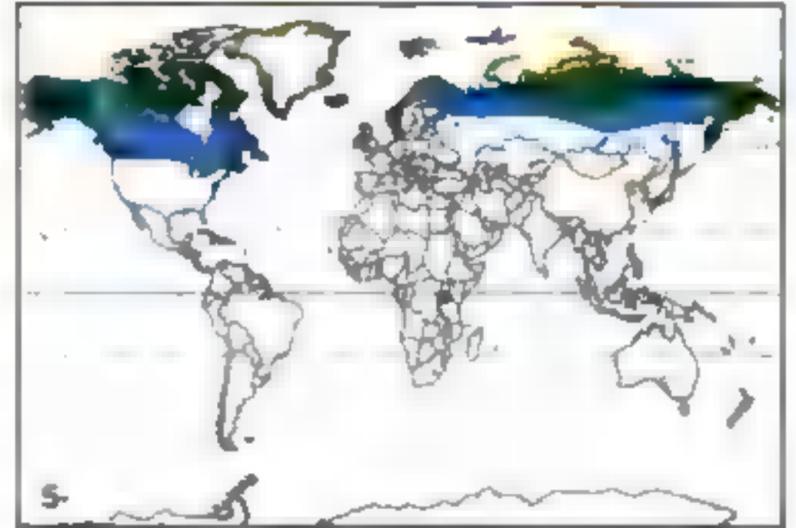
## PLATE 109: GYR FALCON

### 308 Gyr Falcon *Falco rusticolus*

Text and map page 908

L50–63 cm (22 in); S105–131 cm (46 in); T19–27 cm (9 in); ♂80%

Rocky arctic coasts/islands, tundra rivers/lakes with crags, taiga edge, subarctic mountains, to 1,500 m; in winter also flat coasts, steppe, farmland. Largest bulkiest falcon; broad blunt-tipped wings, longish wide-based tapering tail, large feet; wing-tips under two-thirds down tail. Slow shallow beats look confined to hands, but fast and deep in pursuit; glides/soars on flat or slightly bowed wings, tips often upcurved. Like other large falcons, hunts mammals and birds (especially seabirds, grouse, ducks) from low or high flight, or perch; takes much prey from ground or water; chases birds, often rising for final stoop, but seldom stoops from high as 309. Mostly solitary; juveniles together on passage. Polymorphic: white morph ('*candicans*') commonest in Greenland and high Arctic; grey morph ('*islandus*', '*rusticolus*', etc) in Subarctic; dark morph ('*obsoletus*') scarcer; but each may occur anywhere and any or intermediates may be locally dominant, though dark morphs mainly on taiga, white around cliffs. [cf. 309/153; Pal 306; Nea 308]



- 308a White adult (male)** White, variably marked with arrowheads/bars on back/wings, sometimes almost plain (ax); tail correspondingly barred or plain; often some dusky streaks on head; sometimes faint moustaches, few spots/streaks on flanks/thighs; bare parts yellow/orange. Flight below (308ax: ♂): white; dark-tipped wings; sometimes thin spots/streaks on linings/flanks. Whiter bird above (308ay: ♀); few dusky marks on scapulars, coverts, wing-tips, and tail. (Chasing ♂ Common Eider *Somateria mollissima*.)
- 308b Grey adult (female)** Dark slate-grey above, edged/barréd paler, with barréd tail; grey crown/nape usually streaked whitish, thin supercilia, streaky pale cheeks, faint moustaches. Flight below (308bx: ♂): whitish with sparse to (as here) heavy grey-brown streaks on breast/linings, spots on belly, bars on flanks; two-tone wings with obscurely barréd remiges; barréd tail. Above (308by: ♀): all grey but for paler head, edgings and bars; barréd tail. Darker bird above (308bz: ♀): all rather uniform slate-grey.
- 308c Dark-hooded adult (male)** Crown/nape/cheeks all dark brown; streaky cream forehead, usually pale supercilia, and thin moustaches; brown to brown-grey above, barréd/edged paler; white to cream below, with streaks on chest, arrowheads/bars on abdomen. Not unlike 309, but duller (no blue) above with paler cross-bars, less regular bars below; pale supercilia and more extensive forehead; shape, wing/tail proportions and underwings differ.
- 308d Dark adult (male)** Flight below. Dark brown, streaked whitish on breast, more barréd on thighs/belly/crissum; linings spotted; paler greyish remiges with little barring; tail well barréd.
- 308e White juvenile (female)** Not unlike a, but white head finely streaked; back/wings more streaked than spotted or barréd, or mostly brown with broad white edges; tail white or barréd; white underbody more extensively streaked; bare parts green-grey to blue-grey. Flight below (308ex: ♀): much as ax, but often obscure barring on remiges; tail usually white from below.
- 308f Grey juvenile (female)** Flight below. Cream body and linings heavily streaked brown; contrasting paler remiges barréd cream; tail barréd, too; bare parts as e.
- 308g Dark juvenile (male)** All dark brown to grey-brown with paler edges; tail usually plain brown, rarely obscurely barréd at sides; at distance looks almost plain above and lightly streaked below; bare parts as e. (Plucking ♂ Ptarmigan *Lagopus mutus*.)



## PLATE 110: TAITA AND BARBARY FALCONS

### 312 Taita Falcon *Falco fasciinucha*

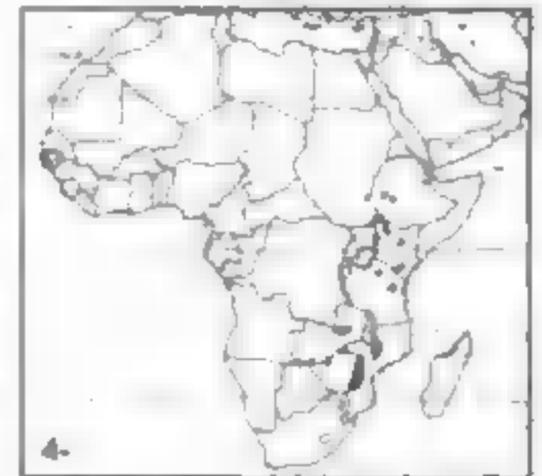
126–30 cm (11 in): S61–72 cm (26 in): T7–9 cm (3 in): ♂70%

Rocky gorges, crags, at 600–3,800 m in wooded uplands with low rainfall; some wander to lowland cultivation/woodland, even savannah, but mostly scarce with fragmented distribution except in Zambezi gorges (often seen at Victoria Falls). Small stocky falcon; merlin-sized, hobby-coloured, peregrine-proportioned; pointed wide-based wings, short tail; wing-tips reach tail-tip. Fast, stiff, shallow parrot-like beats; glides soars on flat or slightly depressed wings. Mainly bird-eater: like 309, circles high and stoops spectacularly; sometimes shoots past and, swooping up, takes prey from below; catches hirundines and swifts; also eats insects in flight like 296. Perches inconspicuously on cliffs or cliff-face shrubs for long periods. Solitary; often pairs. [cf. 296]

**312a Adult (male)** Slate-grey above; paler buff-tipped tail obscurely barred; blacker crown, rufous nape-patches/forehead; white to cream throat and rufous-edged cheeks, bold moustaches; rufous below with few very faint fine black shaft-streaks. Flight below (**312ax**: ♂): pale cheeks/throat; linings rufous as body but lightly barred/spotted; quills finely barred. Above (**312ay**: ♂): rump/tail paler grey than slate to blackish back/wings; rufous nape-patches also show in good light. Diving at Black Swifts *Apus barbatus* (**312az**).

**312b Juvenile (female)** Much as a, but browner-grey above, scapulars/greater coverts buff-edged; less rufous forehead/nape-patches; duller rufous below, more streaks on chest/abdomen. Flight below (**312bx**: ♀): linings usually plain rufous [not streaked as shown], though duller body somewhat streaked. Above (**312by**: ♀): brownish-grey, rump/tail hardly paler, but tail buff-tipped; nape-patches show in good light.

Text and map page 924



### 310 Barbary Falcon *Falco pelegrinoides*

133–44 cm (15 in): S76–102 cm (35 in): T12–16 cm (6 in): ♂64%

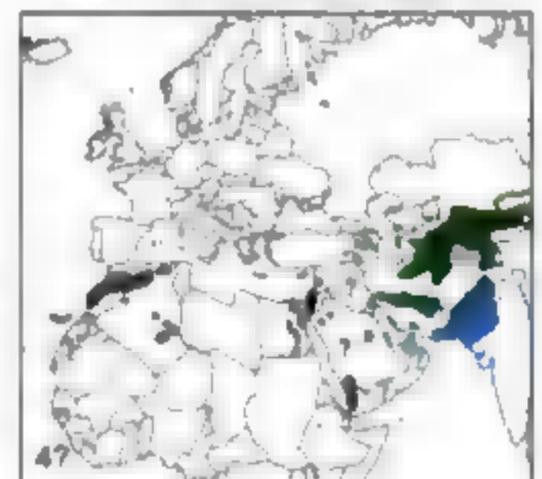
Stony semi-desert and desert, rocky foothills, with bluffs and some trees/bushes, hunting also over cultivation and around oases/settlements, to 1,000 m (2,000 m). Medium to largish falcon often treated as conspecific with 309, but slimmer body, relatively longer thinner wings, longer-looking squarer tail; wing-tips almost reach tail-tip. Flight similar, but normal action faster, shallower, more flickering, with only hands appearing to move. Sudden directional changes when pursuing prey; but most behaviour otherwise comparable. [cf. 309 (esp. 309b), 305]

**310a Adult (male)** (nominate; N Africa, Middle East, SW Arabia) Pale blue-grey above with thin dusky spots, blacker on mantle/shoulders; barred tail with subterminal band, whitish tip; rufous-buff forehead and band around nape, brown crown; thin dusky eye-stripes and moustaches; cream to cinnamon or orange-buff below, cheeks and throat/breast plain, belly lightly spotted or streaked, flanks/crissum thinly barred. Flight below (**310ax**: ♂): cream to buff, barred mainly on flanks, faintly on wings; dusky wing-tips/distal tail-bands; thin moustaches. Above (**310ay**: ♀): blue-grey, rump palest; rufous nape, barred tail. (Flying at ♂ Blue Rock-thrush *Monticola solitarius*.)

**310b Adult (male)** (*babylonicus*; Iran, W Mongolia, also winters India) Little larger; paler grey above, more rufous nape/forehead, narrower moustaches; paler and more rufous-tinged below, sometimes lightly marked only on flanks/thighs. Flight below (**310bx**: ♀): as ax, but even more thinly barred. Above (**310by**: ♀): paler than ay; forehead/nape more contrastingly rufous. [305 similar, but less slim with broader wings, paler crown, more black in head pattern.]

**310c Juvenile (female)** (*babylonicus*) Grey-brown above, broadly edged rufous; brown crown, cream to rufous-buff forehead and around nape, thin moustaches; cream to rufous-buff below, thinly streaked (much less heavily marked than 309). Flight below (**310cx**: ♀): thin-streaked body, barred linings/quills, dark wing-tips, thin moustaches. Above (**310cy**: ♂): rufous-tinged grey-brown; barred tail, brown crown, rufous-buff collar. [Nominate darker brown above, but still rusty-buff on head.]

Text and map page 919





Philip Burton

## PLATE 111: PEREGRINE FALCON I

### 309 Peregrine Falcon *Falco peregrinus* (i)

Text and map page 911

L35–51 cm (17 in): S79–114 cm (40 in): T13–19 cm (6 in): ♂69%

Widest natural range of any bird species (see map facing plate 112), but mostly scarce: coastal cliffs, gorges, forest rivers, moors, tundra, mountains, to 3300 m (4000 m); locally forests, rocky deserts, even cities; hunts/winters estuaries, wetlands, plains, savannah, any other fairly open country. Mid-sized/largish compact falcon; triangular wings with short broad-based arms and long narrow-pointed hands, square/tapering tail, deep chest, broad head and rump; wing-tips near or reaching tail-tip. Flight powerful, fast, agile; stiff shallow beats with short glides, faster/deeper in pursuit; glides on flat wings or with wrists depressed; soars flat with angled leading edges and straight trailing edges, rounder-looking tips, and spread tail. Hangs in updraughts over cliffs, rarely hovers. Locates prey in circling flight or from high perch; stoops, or chases before final stoop; some prey seized without stoop or snatched from tree, cliff or ground. Stoop speeds certainly reach 160 km/h, sometimes possibly 250 km/h (on occasion allegedly 400+ km/h). Mostly solitary, even on migration. Plumages very variable throughout vast range, and notes below must be treated only as general guide. [cf. in north 308; Nea 303; Neo 311/293; Pal 305–307/310/291; Afr 305/306/312; Ind 304/306/310; Aus 300/274/298]

- 309a Adult male** (nominate; most Europe across N Asia S of tundra): Blue-grey above, barred black; paler rump, barred greyer tail; black crown/mantle/shoulders edged blue-grey; broad dark moustaches, cream cheek-patches, white throat; cream to pink-buff below, variably tinged grey, chest flecked black, otherwise barred. (Prey: Rock Dove/Feral Pigeon *Columba livia*.) [Replaced from NE Norway across N USSR by *calidus* (winters S to S Africa/India/New Guinea): bulkier, paler, with more grey-blue crown/mantle; thinner moustaches, larger cheek-patches; whiter and less heavily barred below.]
- 309b Adult male** (*brookei*; Mediterranean/N Iran) Smaller; darker above, sometimes rufous nape-spots/band; pinker below, denser bars.
- 309c Adult male** (*madens*; Cape Verdes) Less RSD; rufous-brown above, head also; collar/cheeks/underbody pinkish-buff. [♀ more tawny/rufous below.]
- 309d Adult male** (*minor*; sub-Saharan Africa) Small; darker above than a (and esp. migrant *calidus*), sometimes rufous nape; cream-buff below, well spotted/barréd.
- 309e Adult male** (*radama*; Madagascar/Comoros) Small; darker above than d; helmeted; heavy barring.
- 309f Adult male** (*peregrinator*; India/China) Smallish; dark slate above; sometimes black cheeks form helmeted head, but often pale cheek-patches; rufous/grey below, well to little barred.
- 309g Adult male** (*ernesti*; S Thailand/Indonesia/Philippines/New Guinea) Darkest race; black above, faintly edged/barréd grey; black helmet; breast buff/rufous, belly/flanks blue-grey, densely barred.
- 309h Adult male** (*macropus*; Australia) Head/cheeks black, forming helmet; N bird shown, being dark blue-slate above, with buff/rufous chest, grey flanks/thighs finely barred. [In SW, smaller, pale rufous chest, black-barréd deep rufous abdomen/flanks (see also i on plate 112).]
- 309j Adult male** (*anatum*; most N America) Averages larger/darker than a, crown blacker; plain or lightly streaked chest white, buff or rufous. [Replaced from Bering Strait to Greenland by *tundrius* (winters S to Argentina/Chile): size of a, and similar above, but pale forehead, larger cheek-patches, thinner moustaches, plain or lightly marked white chest. Replaced to NW by *pealei* (see k on plate 112 and also juvenile t below): largest race; darker; streaks on larger cheek-patches; heavier spots on white chest.]
- 309i Adult male** (*cassini*; S Chile/Argentina/Falklands and N locally to Ecuador) Dark slate above, broadly barred black; like g, h and some f, black cheeks form helmeted head; rufous and grey below, boldly spotted/barréd.
- 309m Pale adult male** (*cassini*; pale 'kroyenborgi' morph, long thought separate species) Pale grey above and all clearly barred blackish; buff to cinnamon crown finely streaked black; large brownish-white cheeks behind thin moustaches; white to cream below, obscurely barred and finely streaked dusky (esp. at sides).
- 309n Adult female** (nominate) Larger than a; slightly darker above; often deeper buff below, sometimes pale rufous, with heavier chest-spots, coarser barring. (Prey: ♂ Eurasian Wigeon *Anas penelope*.)
- 309o Juvenile (female)** (nominate) Dark brown above, thinly edged rufous; buff streaks on head form collar; streaky cream cheeks behind wide moustaches; dark-streaked cream to rufous-buff below, plainer throat; bare parts blue-grey to greenish, legs soon turning yellow.
- 309p Juvenile (female)** (*brookei*) Head marked rufous; darker brownish to rufous below, heavier streaks.
- 309r Juvenile (female)** (*macropus*) Dark cheeks forming helmet as h; buff to orange-buff below with heavy streaks/spots.
- 309s Juvenile (female)** (*anatum*) Darker brown above than o, edged rufous; more rufous below, streaks heavier/darker, Vs on thighs. [Juvenile *tundrius* (see j) has buff forehead, supercilia, cheeks, sometimes crown; thin moustaches; wide buff edges above; often thin streaks below.]
- 309t Juvenile (female)** (*pealei*; Commander to Queen Charlotte Islands, winters S to California) Still blacker above; cheeks/throat heavily marked; solid streaks below.



## PLATE 112: PEREGRINE FALCON II

### 309 Peregrine Falcon *Falco peregrinus* (ii)

Text and map page 911

L35–51 cm (17 in): S79–114 cm (40 in): T13–19 cm (6 in): ♂69%

Text facing plate 111 includes notes on habitat, shape, flight, and confusion species.

**309a Adult** (nominate; most Europe across N Asia S of tundra) ♂♀ below. Broad moustaches, cream cheeks, white throat; often cream to pink-buff tone to breast, but spotted/barréd abdomen and barréd linings look grey, as do greyer-white quills barréd dark grey. Above (**309ax**: ♀): blue-grey to blackish; back/rump/white-tipped barréd tail palest; head/shoulders/remiges darkest.

**309b Adult male** (*brookeri*; Mediterranean/N Iran) Below. Smaller; broader moustaches; rufous-pink tone to breast; forearms and all more closely barréd. Above (**309bx**: ♀): dark slate-grey; often rufous spots on nape, sometimes forming obscure collar or even extending to crown.

**309d Adult male** (*minor*; sub-Saharan Africa) Above. Smaller; darker still; again variable rufous nape-patches or collar, especially in N part of range. [10% smaller, 30% lighter, and clearly darker than migrant *calidus* from N Eurasia (see note under **a** on plate 111).]

**309f Adult male** (*peregrinator*; India/China) Below. Smallish; dark; pink to richly rufous and/or grey below, neatly plain to well barréd. Above (**309fx**: ♀): dark slate with blacker head; any paler strip on cheeks often rufous, sometimes white. [Again smaller and darker than migrant *calidus* (note under **a** on plate 111) and *japonensis* (more like **j**).]

**309g Adult male** (*ernesti*; S Thailand/Indonesia/Philippines/New Guinea) Below. Darkest race; buff to rufous breast and grey abdomen; linings heavily barréd; remiges paler. [Black above, faintly edged/barréd; black helmet; much darker than *calidus* (see **a** on plate 111).]

**309h Adult male** (*macropus*; Australia) Below. Black head; cheeks form helmet as **f/g**; variably white to buff/rufous chest (see **h** on plate 111 and **l** below); grey abdomen/linings; all barring fine.

**309i Dark adult male** (*macropus*; 'submelanogenys', formerly treated as distinct race) Below. Helmeted head as **h**; chest often buff, breast/abdomen richly rufous with coarser barring.

**309j Adult male** (*anatum*; most N America) Below. Averages larger than **a**; white to rufous chest plain or lightly streaked. Above (**309jx**: ♀): darker, crown blacker. [Replaced to NW by *pealei* (see **k**), and from Bering Strait to Greenland by *tundrius* (wintering S to Argentina/Chile): as **a**, but forehead paler, cheek-patches larger, moustaches thinner, white chest plain or lightly marked.]

**309k Adult male** (*pealei*; Commander to Queen Charlotte Islands, winters S to California) Above. Longer broader tail than **j**; darker; larger white cheek-patches streaked. [Whiter chest, heavier spots.] (Prey: Ancient Murrelet *Synthliboramphus antiquus*, of similar range.)

**309o Juvenile female** (nominate) Below. Cream to rufous-buff, streaked dark brown except throat; linings coarsely barréd, looking browner at distance than greyish wings of **a**; remiges much as **a**, but barréd tail browner; creamy cheek-patches lightly streaked, narrower moustaches.

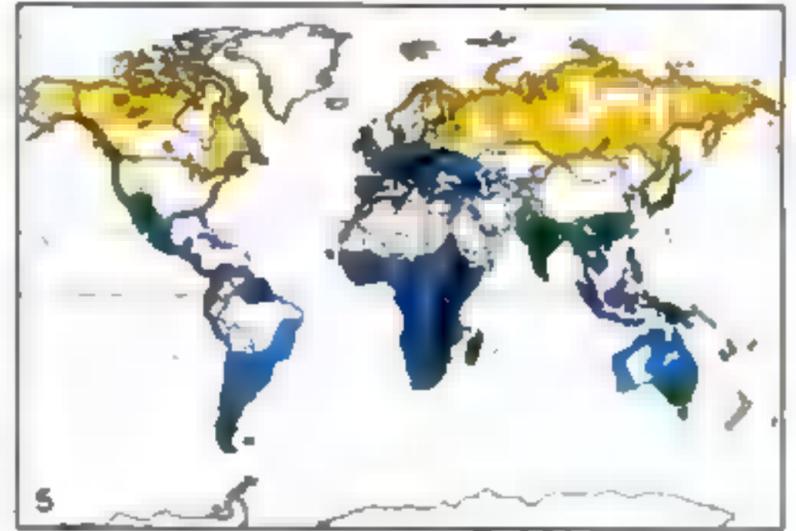
**309p Juvenile female** (*brookeri*) Below. Darker than **o**; browner to rufous, more heavily streaked.

**309q Juvenile female** (*peregrinator*) Below. Rusty-brown; bold thin streaks; reduced cheek-patches. [Migrant juvenile *calidus* (see note under **f** above and also **a** on plate 111) larger, whiter, broadly streaked.]

**309r Juvenile female** (*macropus*) Below. More or less deep buff underparts, with dusky streaks on breast, coarse wavy bars on flanks/thighs; dark cheeks forming helmet as on **h**, but browner.

**309s Juvenile female** (*anatum*) Below. More rufous than **o** and heavier darker streaks, thighs with arrowheads; buff cheek-patches. [Juvenile *tundrius* (see **j**) creamy below, narrower streaks, thin moustaches.]

**309t Juvenile female** (*pealei*) Below. Much darker than **a**; broader streaks, so looks almost solidly dark with pale lines; also cheeks, throat streaked.





# ORDER CICONIIFORMES

## Family Cathartidae (New World vultures)

### 1 BLACK VULTURE *Coragyps atratus* (Bechstein, 1793)

Plate 4

Other name: American Black Vulture

**DISTRIBUTION** Nearctic and Neotropical (41°N to 44°S); order 7; despite decreases or extinctions in some regions, often still common and widespread, locally abundant. North, Central and South America: eastern and southern USA (north to New Jersey, southeast Pennsylvania, Maryland, Virginia, Kentucky, southwest Ohio, south Indiana and Illinois, southeast Missouri, east Oklahoma and north Texas, also south Arizona, but common only in southeastern states east from Texas), almost throughout Mexico (not Baja California and adjacent northwest Sonora, nor western sides of Chihuahua and Durango) and all countries of Central and South America (but absent southern Peru, southwest Bolivia, northern Chile and northwest Argentina, especially in Andes, as well as Chile and Argentina south of 44°S and 41–42°S respectively, and scarce or rare in some adjacent parts of those countries except west-central Chile and central to northeast Argentina). Also many islands, including Cozumel (Mexico), Coiba, Taboga and las Perlas (Panama), Margarita, Cabagua and Coche (Venezuela), and Trinidad.

**MOVEMENTS** Generally sedentary, but some evidence of migratory movements westward (March–April) and eastward (November) through Panama and, possibly, Costa Rica; elsewhere, clearly resident or locally nomadic. Has wandered northward in northeast United States and southeast Canada (as far as Wisconsin, and

southern Ontario and Quebec, reaching 47°N) and south in Argentina and Chile (reaching 46°S), as well as in Caribbean (at least Cuba and Jamaica).

**HABITAT** Any open or lightly wooded country, but especially urban areas and watersides, concentrating at rubbish dumps, slaughterhouses, river and coastal fishing villages and ports, and deltas and lake shores; rare in dense forest except by rivers and human settlements. Sea-level to 2,000 m over much of range, but commonly to 2,700 m in Venezuela and Colombia, and rarely to 3,000 m in both Central and South America.

**FIELD CHARACTERS** Smallish but stocky cathartid vulture, almost all black at all ages, with longish slender bill, bare head and upper neck transversely corrugated when adult, relatively short wings, very short tail (shortened still more by wear against ground), and longish legs. Fairly tame where not persecuted. Perches upright, usually openly on trees, buildings, pylons, posts or ground, often with spread wings, or inside canopy in heat of day; walks sedately, or hops, or shuffles faster with wings half-raised and sometimes tail cocked; wing-tips exceed tail-tip. Sexes similar, and almost identical in size, though at local levels female may average 1–2% smaller; juvenile also rather similar, but distinguishable. **PERCHED Adult** Plumage all black when settled, more or less slightly glossed purplish above, with grey-black head and whitish-tipped bill. **Juvenile** All black too, with duller upperparts, blacker head less wrinkled and more bristly, and dark-tipped bill. **Bare parts** Eyes dark brown. Adult bill blackish with ivory tip, juvenile all dusky. Adult head grey-black, juvenile black. Legs whitish-grey.

**FLIGHT** Large dark raptor with pointed triangular head, broad six-fingered wings held slightly forward – accentuating bulging secondaries – and toes usually reaching (can just exceed) tip of short squared tail, or sometimes legs dangling; wingspan 2.8 times total length. Often distinctive three to five shallow rapid beats and then short glide on flat wings, rather than mostly soaring; soars with wings level, or only slightly raised, and tail partly spread; may bow wings down until tips almost meet; drops fast to food with enormous whoosh as wings opened on landing. **Adult** All dark but for white-shafted outer primaries above (hidden by long secondaries at rest) and more or less distinct white primary-patches below (see Geographical Variation); bill-tip and legs may also show up as paler at closer ranges. **Juvenile** Hard to distinguish in flight unless, in good conditions, bill certainly dark-tipped or, in direct comparison with adult, head clearly blacker.

**CONFUSION SPECIES** American vultures of genus *Cathartes* – Turkey, and Lesser and Greater Yellow-headed [2–4] – are, in general, relatively slimmer, with less upright stance, smaller head (coloured when adult), shorter neck, longer tail, longer and narrower wings more or less two-toned on undersides (but lacking contrasting primary-patches), and fly with slower, deeper



beats; Turkey and Lesser Yellow-headed also rock from side to side on markedly raised wings when gliding and soaring. Juvenile King Vulture [7] more similar to Black in colour, shape and wing actions, but generally larger, less upright, with shorter heavier bill, orange foreneck and bill-base and, in flight, showing seven to eight fingers and no white on any primaries; also often some white mottling on underbody and wing-linings. Most other big dark raptors have yellow cere and legs, and lack white primary-flashes: consider dark-morph buteos (rounded head, contrasting silvery flight-feathers, patterned tail), and adult black hawks [176–178] and solitary-eagles [183–184] (all with larger head, banded tail, slower deep wingbeats); New World eagles and fish-eagles have longer tail and different underwings.

**VOICE** Low hisses, grunts and croaks at times of stress or annoyance, usually when feeding or disturbed at roost, but audible only over short distances.

**FOOD** Carrion, scraps from rubbish dumps and seabird colonies, and variety of living prey, most significantly sea-turtle hatchlings, also eggs and nestlings of, notably, young herons (Ardeidae) and seabirds, lizards and small snakes, fish, insects, and once a skunk *Mephitis*, as well as bananas, avocados, fruits of oil and royal palms *Elaeis/Scheelea*, and copra. Sometimes attacks young livestock, notably newborn pigs and calves. Carrion ranges from large carcasses to small roadkills, and mammal and fish offal. Forages mainly by soaring, often at great heights, watching for food sources or gatherings of other vultures. Unlike Turkey Vulture and congeners [2–4], has no olfactory sense and so must follow them to locate carcasses hidden by trees, but then is often dominant, not least by weight of numbers.

**SOCIOSEXUAL BEHAVIOUR** Highly gregarious and aggressive at carcasses, garbage and roosts, in concentrations of up to 200+ when feeding and 1,000+ when roosting; but forages singly or in pairs or, often, family parties. Often roosts with other cathartids, especially Turkey Vultures [2], on trees, pylons, tall buildings or low cliffs. Soars high above nesting area, and single birds or pairs may dive, spiral or chase in courtship flight, but most displays on ground, where males strut with head lowered and wings spread.

**BREEDING** Varies with latitude: in USA, March–August in Ohio but January onwards in Florida; in Central America, from November in Costa Rica and from January in Panama; in northern South America, mostly October onwards, but from November in Trinidad and February in Ecuador, while laying starts September in Argentina and Chile. Pairs typically nest singly, but are sometimes loosely social. No material used; eggs often laid on ground under overhanging rocks or thick low vegetation, occasionally more openly among tree roots; or in hollow stump or tree cavity, or old tree nest of another

large bird; sometimes in small cave in low cliff, rarely more than 3–4 m up, but locally also in crannies on high city buildings. Clutch 2 (1–3). Incubation variously recorded at 32–45 days, but probably usually at least 39 days. Fledging 10–14 weeks, but may wander out of and back to nest site at any time after c10 weeks; fed by regurgitation. Not fully independent for months and, even then, continue to forage with parents in social groups.

**POPULATION** Often poisoned, with other scavengers, or trapped or shot for damage to livestock (see Food) and supposed transmission of diseases, or just killed for 'sport'; also affected by fewer carcasses in areas of sanitary ranching and sheep-farming. Despite resulting declines in, for example, USA and west and central Mexico and extinctions in, for instance, south Peru (disease in 1960s) and much of modern wheat belt of east-central Argentina, it has benefited greatly from many such human activities as deforestation, cattle-rearing, fishing and the provision of slaughterhouses, rubbish dumps and other concentrated food sources. Still generally frequent to common, sometimes abundant, in much of vast range of over 22 million km<sup>2</sup>: population must run into millions.

**GEOGRAPHICAL VARIATION** Three races usually recognised.

*C. a. atratus* (USA, subtropical Mexico) Larger; primary-patches whitish.

*C. a. brasiliensis* (tropical Mexico, Central and South America as far as coastal Peru, lowland Bolivia and southern Brazil) Smaller; primary-patches whiter and more extensive.

*C. a. foetens* (Andes of south Ecuador and north Peru, and Chile and Argentina into Paraguay and perhaps Uruguay) Larger; primary-patches obscure.

**MEASUREMENTS** *C. a. atratus* ♂♀ wing 414–445 mm, tail 172–212 mm, tarsus 70–83 mm. *C. a. brasiliensis* ♂♀ wing 386–413 mm. *C. a. foetens* ♂♀ wing 412–437 mm. **Weights** *C. a. brasiliensis* ♂♀ 1.18–1.94 kg.

**REFERENCES** Bang (1972), Bent (1957), Berger (1982), Blake (1977), Brown (1976), Canevari *et al.* (1991), Clark & Wheeler (1987), Coleman & Fraser (1987), Contreras *et al.* (1990), de la Peña (1992), Eisenmann (1965), Elias & Valencia (1982), Fjeldså & Krabbe (1990), Flieg (1972), Friedman (1950), Greider & Wagner (1960), Haverschmidt (1947, 1955, 1968), Hilt & Brown (1986), Hope (1949), Hopkins (1953), Houston (1994), Howell & Webb (1995), Jackson *et al.* (1978), Kushlan (1975), Layne (1947), Lemon (1991), [Ligon (1967)], Lovell (1947), McHargue (1981), McIlhenny (1939), Meyer de Schauensee & Phelps (1978), Mrowovsky (1971), Palmer (1988), Parmalee (1954), Parmalee & Parmalee (1967), Rabenold (1986, 1987a/b), Ridgely & Gwynne (1989), Root (1988), Salaman (1993), Sick (1993), Slud (1964), Smith (1980, 1985), Snyder & Snyder (1991), Sprint (1946), Steirly (1966), Stewart (1974, 1978, 1983), Stiles & Skutch (1989), Thomas (1928), Thurber (1981), Wetmore (1965), Wheeler & Clark (1995), Wilbur & Jackson (1983).

## 2 TURKEY VULTURE *Cathartes aura* (Linnaeus, 1758)

Plate 4

Other name: Turkey Buzzard

**DISTRIBUTION** Nearctic and Neotropical (53°N to 55°S); order 7; has decreased in some areas and in-

creased or spread in others, remaining generally fairly common to common, at times locally abundant, North, Central and South America, and Caribbean; southern

Canada (British Columbia and south-central Alberta to southwest Ontario) and throughout much of USA, Mexico and all countries of Central and South America south to Tierra del Fuego, and Falklands [Islas Malvinas], as well as northwestern Bahamas, Cuba, Isla de la Juventud [Isle of Pines], Haiti (formerly), Puerto Rico (introduced about 1880), Trinidad, and various mainland offshore islands, including Tres Marias and Cozumel (Mexico), Islas de la Bahía (Honduras), Coiba, Taboga, and las Perlas (Panama), and Margarita (Venezuela).

**MOVEMENTS** In Central and northern South America mostly sedentary, or somewhat nomadic, but entirely migratory in much of North America, except for extreme southwest (coastal California and south Arizona) and southeastern third of USA (south of line from Texas to Connecticut), and probably partially migratory in southern Patagonia. Many North American Turkey Vultures winter in South America, travelling south in September–November and north again during February–April (January–May); annual counts passing through Isthmus of Panama in autumn of 1970–82, mostly recorded on film, averaged over 190,000, with maximum of 307,114 in 1978 (Smith 1985). Some possibly travel as far as Paraguay, but many may not proceed much beyond northwestern South America, and even in Panama numbers are higher in winter than in summer.



**HABITAT** Wide variety of lightly timbered or more open country, from woodland and savannah through grassland to coastal desert, but also in forest where canopy not closed. Unlike Black Vulture [1], not typically as-

sociated with garbage or urban areas, though sometimes occurs on rubbish dumps or in fishing and other villages, but race *falklandicus* (see Geographical Variation) is found in towns in south Peru, where Black has disappeared, as well as in southernmost Chile and Argentina. Commonest sea-level to 2,200 m, but also regular, if uncommon, to 3,000 m or even 3,500 m, and has wandered to 4,300 m in Bolivian Andes.

**FIELD CHARACTERS** Medium-sized slim cathartid vulture, all blackish-brown in plumage, with longish and not particularly slender bill, small bare warty head and transversely wrinkled upper neck (both red when adult), long wings, longish tail, and medium-length legs. Rather shy, but locally tamer where not persecuted. Perches less upright than Black Vulture [1], but similarly often with spread wings, and usually openly enough on tall trees and telegraph poles, less frequently on low posts, sandbars or, except at communal roosts, buildings; walks, hops, lollops; wing-tips reach or just exceed tail-tip. Sexes similar, but female may average 1–2% larger; juvenile and subadult distinguished by head and bill colours.

**PERCHED Adult** All blackish-brown to blackish, somewhat glossed with purplish and green, especially on neck and back, and variably edged and scaled with grey-brown, most noticeably on back, scapulars and wing-coverts, and most broadly in more northerly and southerly populations (see Geographical Variation); head almost bare, apart from sparse bristles, and mainly deep pink to red with contrasting whitish bill; pinkish to reddish legs, but often whitened by purposeful defecation. (Like storks, cathartids use urine evaporation for cooling their feet, which they raise alternately to the cloaca.) **Juvenile** Plumage similar, if duller, with thinner scaling; but bill and head dusky-grey with brown fuzz on crown and nape. **Bare parts** Eyes greyish-brown. Adult bill whitish with red cere, juvenile dusky with paler base and grey cere, second-year whitish with dark tip. Adult head pinkish-red to purplish-red with greenish-white pimples in front of and below eyes and, in some populations, yellow wrinkles on nape; juvenile dusky-grey. Adult legs pale flesh to pinkish-red, juvenile greyer.

**FLIGHT** Large, dark raptor with small head, long and fairly broad six-fingered wings, and longish tail slightly round-tipped; wingspan 2.5 times total length. Slow, deep flexible beats, but characteristically glides, sails and soars rocking from side to side with wings raised in clear V and little flapping; gliding in strong winds, wings may be flexed back and less raised; may bow wings down until tips almost meet. **Adult** Looks all dark (including head at distance except in good light) but, from below, silvery flight-feathers contrast clearly with black wing-linings to give two-tone effect; grey undertail less obviously contrasting; bill often clearly paler than head, and brownish-white feather-shafts form slightly lighter patch on base of upperside of outer primaries. **Juvenile** Very similar in flight unless head clearly seen to be dusky and not red, but absence of contrastingly whitish bill may also help.

**CONFUSION SPECIES** Black Vulture [1], other common cathartid over much of range, is clearly black, and stockier, with more upright stance, longer thinner bill, larger-looking head on longer thicker neck, much shorter tail, and shorter and broader wings uniformly black below but for contrasting primary-patches; also

flies quite differently, with fast shallow beats and no rocking; even so, it and dusky-headed juvenile Turkey sometimes confused. In Central and South America, Lesser Yellow-headed [9] is very similar, if marginally smaller and slimmer with proportionally shorter tail (so folded wings project very clearly beyond tip), and flies with same rocking action, but is often closely linked with wetlands, usually perches low, and quarters just over ground more like harrier; plumage generally blacker, with more contrasting whiter shafts to outer primaries; adult head colour quite different (head and bill look uniformly paler, without Turkey's contrast), and juvenile has somewhat whitish area on nape and whiter legs (but latter character not always reliable: see 'Bare parts'). Greater Yellow-headed [4] is larger, blacker, with heavier and less rocking flight on flatter wings that show distinctive dark strip on undersides of inner primaries. Zone-tailed Hawk [199] is interestingly similar in shape and colour, even to two-tone underpattern on V wings, but is smaller, with hunched tail, barred remiges, dark head fully feathered and, like most other big dark raptors, yellow cere and legs; consider dark-morph Long-winged Harrier [103] (pale-banded flight-feathers, tail and rump) and dark-morph buteos (rounded head, proportionally broader wings with dark trailing edges, patterned tail). In North America and Mexico, Golden Eagle [224] lacks two-tone underwings, soars and glides on less markedly raised wings, and has large feathered head.

**VOICE** Usually silent; at most 'low hiss or raucous grunt' (Stiles & Skutch), audible only at close ranges.

**FOOD** Mainly carrion, especially corpses of small animals, but including large carcasses, fish offal and mammal faeces; more occasionally, rotting vegetable matter, such as pumpkins and fruits of oil palm *Elaeis*, rarely kills for itself, unlike Black Vulture [1], but individuals recorded catching and eating grasshoppers and live fish, taking nestlings and eggs of herons (Ardeidae) and ibises (Threskiornithidae), pirating Great Blue Heron *Ardea herodias*, and attacking sick or injured animals. The three vultures of the genus *Cathartes* have highly developed olfactory senses, and Turkey forages by quartering and making random transects at fairly low to medium heights, often locating by smell even when food hidden in vegetation. Will thus feed on corpses of small mammals, birds and even snakes; frequently comes to road-kills, sometimes to rubbish dumps, but in general is rather different kind of scavenger from Black (see Habitat). Easily dominated by other vultures at large carcasses, particularly when Blacks arrive in numbers, then waiting at one side or circling overhead until only small pickings remain. Thought not to feed on migration.

**SOCIOSEXUAL BEHAVIOUR** Much less gregarious than Black Vulture [1]; often singly or in twos and threes, except on migration, when may travel in loose flocks of some thousands; but communal roosts may reach several hundreds, often with Blacks, in tall trees or on buildings. No particular aerobatics other than normal soaring, but small groups sometimes perform stylised courtship dances on ground.

**BREEDING** Varies greatly with latitude: May–October in north USA but March onwards in Florida; from December in Cuba, from November in Costa Rica, and from at least February in Panama and January in Colom-

bia; few other data from tropics, but August–January in north Chile and probably similar in north Argentina. Pairs nest singly. No material used; eggs usually laid on floor of cave, on ground among rocks or thick low vegetation, or in hollow stump; more rarely, well up in tree cavity or old raptor nest. Clutch 2 (1–3). Incubation 38–41 days. Fledging 10–12 weeks; fed by regurgitation.

**POPULATION** Perhaps less persecuted than Black Vulture [1], and less affected by sanitary farming because of smaller dependence on large carcasses, but, conversely, some evidence of greater exposure to effects of pesticides. Generally at least frequent to fairly common, often common, sometimes abundant, over much of its vast range of around 33 million km<sup>2</sup>. Actually-filmed totals of North American migratory population on autumn passage through Panama have annually run well into six figures and, though they will have included many juveniles, those migrants come from only one-tenth of the whole distribution. Separate estimated season's total of about one million over Veracruz (Mexico). Total population must clearly amount to several millions.

**GEOGRAPHICAL VARIATION** Six races recognised, but northernmost and southernmost, *meridionalis* and *falklandicus*, often treated as synonymous with those that precede them below, as differences in size and colour saturation of plumage essentially clinal; indeed, much overlap, and distinctions given are simplifications.

*C. a. aura* (southwestern USA, Mexico, Central America south to about Costa Rica, and southern Florida into Greater Antilles) Averages smaller; blackish with brown edges; head red; sedentary except in mountains.

*C. a. septentrionalis* (eastern and southeastern USA, except southern Florida) Larger and browner; head red with more purple-red nape; mainly sedentary.

*C. a. meridionalis* (southern Canada and northern and central USA, migrating to southeast Central and mainly northern South America south perhaps to Tropic of Capricorn) Largest and brownest race (but still glossed purplish on neck and back), with broad brown edges above; head red with purplish nape; almost entirely migratory.

*C. a. ruficollis* (Panama into lowland tropics of northern Colombia and South America east of Andes, south to north Argentina, Paraguay and Uruguay) Smaller; blacker, with only slight brown edges; head red, but distinct bluish-white to yellowish corrugations on nape to hindneck; sedentary.

*C. a. jota* (slopes and valleys of Andes from Colombia to steppes of Patagonia) Smaller; blackish with brown edges; head bright red; altitudinal movements.

*C. a. falklandicus* (Pacific lowlands, occurring up into western Andes, from Ecuador to Tierra del Fuego, and Falklands) Resembles *jota* but averages larger and browner, sedentary, but some northward wandering.

**MEASUREMENTS** Central American *C. a. aura* ♂♀ wing 458–538 mm. North American *C. a. septentrionalis* and *C. a. meridionalis* ♂ wing 518–550 mm, ♀ 527–559 mm; ♂ tail 252–285 mm, ♀ 270–298 mm. Lowland tropical South American *C. a. ruficollis* ♂♀ wing 485–530 mm. Upland and temperate South American *C. a. jota* and *C. a. falklandicus* ♂♀ wing 470–530 mm. **Weights** *C. a. ruficollis* ♂♀ 0.9–2 kg.

**REFERENCES** Arad *et al.* (1989), Bang (1972), Bem (1937), Blake (1977), Brown (1976), Canevari *et al.* (1991), Clark & Ohmart (1985), Clark & Wheeler (1987), Coleman & Fraser (1987), Coles ([1938], 1944), Contreras *et al.* (1990), Davis (1979), de la Peña (1992), Ejeldsá & Krabbe (1990), Hatch (1970), Haverschmidt (1968), Henckel (1981, 1985), Hilty & Brown (1986), Hiraldo *et al.* (1991), Houston (1985, 1986, 1988), Howell & Webb (1985), Jackson *et al.* (1978), Kushlan

(1973), Lemon (1991), Lever (1987), Loftin & Tyson (1965), Mote (1960), Owe & Northington (1961), Palmer (1988), Ridgely & Gwynne (1989), Root (1988), Salaman (1993), Saller (1977), Sick (1993), Slud (1964), Smith (1980, 1985), Snyder & Snyder (1991), Stager (1964), Stewart (1977, 1978), Stiles & Skutch (1989), Temple (1960), Trstain *et al.* (1992), Vogel (1950), Wetmore (1964, 1965), Wheeler & Clark (1995), Wilbur & Jackson (1983), Work & Wood (1942).

### 3 LESSER YELLOW-HEADED VULTURE *Cathartes burrovianus* Cassin, 1845

Plate 4

Other names: Yellow-headed Vulture, Savannah Vulture

**DISTRIBUTION** Neotropical (23°N to 30°S); order 6; locally common, but patchy and open to confusion with congeners. Central America and mainly tropical South America: southeast Mexico (on both slopes from south Tamaulipas and, more thinly, Oaxaca), very locally in Central America – only parts of Guatemala (since 1970s), Belize, possibly El Salvador, Caribbean coasts of Honduras and Nicaragua to northeast Costa Rica, and Panama – to Colombia and, east of Andes, from Venezuela and Guianas south through east Ecuador and Brazil to east Peru and Bolivia, Paraguay, north Argentina (south to Santa Fé and Corrientes) and east Uruguay; locally distributed in various regions of Brazil, where said to be commonest in northeast (coastal Alagoas) and parts of Amazonia (but probably at least some confusion with Greater Yellow-headed [4]).

**MOVEMENTS** Often regarded as sedentary, but evidently at least regional or nomadic movements: thought to vary seasonally in Panama, and significantly higher numbers in northern Colombia and north Venezuela during October–February/March, while more southerly ‘*urubitinga*’ (see Geographical Variation) apparently occurs only during April–October in northern South America. In contrast, one report of many hundreds flying southwest in Rio Grande do Sul, southeast Brazil, in April.



**HABITAT** Lowland marsh, coastal swamps and mangroves, seasonally inundated grassland, wetter savannah and other open woodland, marshy riverine or broken forest, ricefields; generally avoids dry cultivation, though may sometimes forage over any lowlands, occasionally even urban areas. (Elsewhere, still regarded as essentially a forest bird, but this undoubtedly due to continuing confusion with Greater Yellow-headed [4].) Mainly sea-level to 1,000 m, but reported to 2,000+ m in Bolivia.

**FIELD CHARACTERS** Small slim cathartid vulture, mainly blackish, with fairly slender bill, bare and wrinkled orange-yellow and blue head, long wings, and medium-length tail. Usually perches on fence posts, stumps and low in trees, or on ground; moves on ground with long bouncy leaps like all cathartid vultures; regularly sunbathes with spread wings; wing-tips at least reach tail-tip and may project well beyond. Sexes similar, with little difference in size: female may be anything from 12% smaller to 18% larger and, on limited data, averages only 6% heavier; juvenile differs mainly in head colour.

**PERCHED Adult** Entirely black above, variably green-glossed, becoming slightly browner in worn plumage; and browner black below; head mainly intense yellow-orange with some red and grey (see ‘Bare parts’). **Juvenile** Duller blackish, with some buff edges on wing-coverts; head dusky. **Bare parts** Adult eyes red, juvenile browner. Adult bill ivory to pink-white, rest of head predominantly bright yellow to intense orange, sometimes red on forecrown and nape, but crown, loreal spot and, more variably, throat blue-grey or blue-green to violet; juvenile bill and head dusky-greyish with variably whitish nape. Adult legs flesh to grey-white, juvenile more creamy, but often whitened by purposeful defecation (see Turkey Vulture [2]).

**FLIGHT** Largish slim raptor with extended triangular head looking neckless, long but not particularly broad wings and medium tail (shorter than on congeners); wingspan 2.7 times total length. Takes off with deep flexible beats but, like Turkey Vulture [2], flight characterised by long glides, tilting or rocking from side to side on markedly V wings; forearms angled forwards; said seldom to soar high, usually travelling low over open ground. **Adult** Largely blackish; whitish shafts to outer six primaries produce contrasting pale panel on upperwings, often surprisingly conspicuous (but occasionally lacking; M Pearman); below, two-tone underwings formed by contrasting silvery flight-feathers; head may look yellow, orange, even red, or partly grey-blue according to angle and individual variation. **Juvenile** Similar but for dusky head and bill, whitish nape-patch.

**CONFUSION SPECIES** Outline, two-tone underwings and rocking glide very like generally more familiar Turkey Vulture [2], which usually perches and soars higher up; though slightly larger and more thickset with relatively longer tail, more uniform primaries (insignificantly paler shafts) and more clearly red head, distinction can be difficult if neither head colours (themselves rather variable) nor primary shafts clear, and almost impossible at greater distances. Long confused also with Greater Yellow-headed [4], which, however, is larger, broader-winged, relatively longer-tailed, with steadier flight on flatter wings, and has yellower head (again variable), glossier and more velvety-black plumage, and less silvery flight-feathers below with blackish patch on inner primaries contrasting with grey secondaries. Black Vulture [1] also has white primary shafts, but is otherwise all black with longer head, much broader wings, short tail and quite different flight. See also King Vulture [7], Zone-tailed Hawk [199] and harriers [94, 95, 103].

**VOICE** Generally silent. Lacking syrinx, can only hiss, grunt or croak in fear or annoyance like other cathartid vultures, and such sounds audible only at short ranges.

**FOOD** Not usually attracted to larger carcasses and may swallow live invertebrates and larvae, possibly also frogs, as much as smaller items of carrion. Carrion records include smallish mammals, snakes and other reptiles and, especially, rotting fish. Forages mainly by transect-sailing like harrier *Circus*, low over marshes, wet grassland and riverine forest; walks on freshly ploughed ricefields. Like Turkey Vulture [2], locates dead animals in cover by smell; similarly thought not to feed on migration.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, very seldom in small groups; if several perched in one area, usually well separated. Any displays likely to be mainly on ground, where may hammer on wood with bill.

**BREEDING** Few data. Evidence of egg-laying August in east Colombia and February in Surinam, at similar latitudes, so nests perhaps occupied in almost any month within few degrees of equator; otherwise, March–July

likely in north of range and September–February in south, but 2 recently fledged young in southeast Brazil in mid May. Eggs laid in large cavity in old tree, under grass tussock, or in comparable hollows. Clutch 2. Incubation and fledging periods not recorded, but likely to be c40 and c75 days.

**POPULATION** Few data. Limits enclose over 12 million km<sup>2</sup>, but probably at least two-thirds is unsuitable habitat and, even then, distribution patchy. Six-figure population no more than guess but, even though Greater Yellow-headed [4] now understood to be main South American forest vulture, Lesser still seems locally common enough elsewhere to justify this order of magnitude. Likely to be declining, but little known. In southeast Mexico, coastal and swamp habitats make it particularly vulnerable to extensively used pesticides, as well as to industrial pollution and coastal oiling.

**GEOGRAPHICAL VARIATION** Cline of increasing wing length eastwards and southwards in South America. Usually regarded as monotypic on grounds that some larger individuals also occur farther northwest, but such records mainly during April–October, which may indicate migration from south. These larger birds, which tend also to have more straw-coloured primary shafts, sometimes treated as separate race, '*urubitinga*', dividing line being roughly southeast Colombia to Guyana.

**MEASUREMENTS** '*C. b. burrovianus*' ♂ wing 432–455 mm, ♀ 444–459 mm; ♂♀ tail 193–238 mm, tarsus 51–60 mm. '*C. b. urubitinga*' ♂ wing 457–502 mm, ♀ 461–509 mm; ♂♀ tail 204–255 mm, tarsus 53–69 mm. Width of central tail-feathers typically 42–51 mm (cf. Greater Yellow-headed [4]). **Weights** ♂ 0.95–1.42 kg (two), ♀ 0.96–1.55 kg (four).

**REFERENCES** Belton (1984), Blake (1977), Canevari *et al.* (1991), Contreras *et al.* (1990), [Clinton]-Batnicar (1983a/b), de la Peña (1992), Dickerman (1975), Friedmann & Smith (1950), Haverschmidt (1968), Hilty & Brown (1986), Houston (1986, 1994), Howell & Webb (1995), Koester (1982), Kurz (1970), Lemon (1991), Meyer de Schauensee & Phelps (1978), Olrog (1985), Ridgely & Gwynne (1989), Sick (1983), Slud (1964), Siles & Skutch (1989), Teixeira *et al.* (1986), Tostain (1980), Tostain *et al.* (1992), Wetmore (1964), Yanosky (1987).

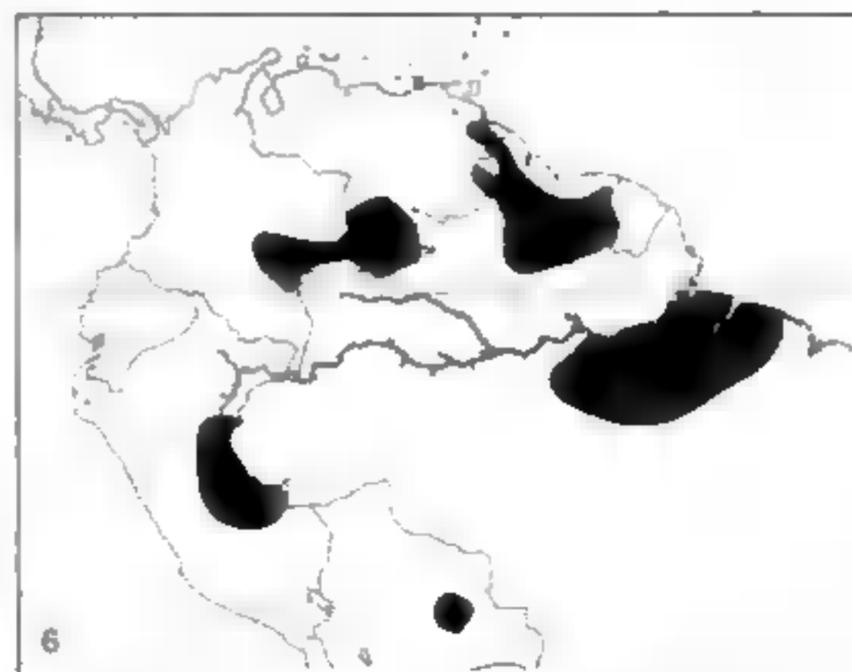
## 4 GREATER YELLOW-HEADED VULTURE *Cathartes melambrotus* Wetmore, 1964

Plate 4

Other name: Forest Vulture

**DISTRIBUTION** Neotropical (10°N to 22°S); order 6; although first described only in 1964 and still confused with Lesser Yellow-headed Vulture [3], whose range both surrounds and overlaps it, this is the common cathartid of extensive South American forest. South and east Venezuela and Guianas, lower and upper Amazonia (south perhaps into Goiás), westwards to eastern Colombia and Ecuador and northwest Peru, and southwards to north and east Bolivia, north Paraguay and possibly northwest and northeast Argentina (two unconfirmed sight records only).

**MOVEMENTS** Perhaps generally sedentary, but occasional identifications outside main range, as in western Bolivia (La Paz) and northern Argentina, may or may not indicate some wandering.



**HABITAT** Extensive primary forest, mainly in tropical lowlands but, at least locally, sometimes at near-temperate altitudes in eastern Andes; also seen over grassland close to forest. Typically sea-level to 1,000 m, chiefly below 700 m, but very locally to 2,000 m.

**FIELD CHARACTERS** Smallish but relatively bulky cathartid vulture with fairly slender bill, bare wrinkled head and longish tail. Perches in trees, either within canopy or conspicuously on high dead branches; wing-tips may fall more clearly short of tail-tip than on congeners, though this also dependent on wear. Sexes similar, apparently with very little difference in size, though female possibly longer-tailed; juvenile differs mainly in head colour.

**PERCHED Adult** All rich velvety-black with variable green and purple sheen; even in worn plumage, matt black with little suggestion of brown; head rich light yellow, with little suggestion of orange or red, but for blue crown and blue eye marks (see 'Bare parts'). **Juvenile** Duller blackish with dusky head. **Bare parts** Adult eyes red, juvenile browner. Adult bill ivory to pink-white, rest of head all yellow, or pale orange-yellow, except for blue, grey or pink central to rear crown and blue spot in front of or extending partly around each eye; juvenile bill and head dusky (with whitish nape). Adult legs dingy-white, supposedly with blacker feet, but in any case often whitened by defecation (see Turkey Vulture [2]).

**FLIGHT** Largish bulky raptor with extended triangular head looking neckless, long broad wings and longish tail (proportionately longer than on congeners unless worn); wingspan 2.5 times total length. Takes off heavily with deep beats, and glides on more or less level wings (slight dihedral at most) with little or no rocking action; soars high over forest. **Adult** Predominantly black, with brownish-grey undersides to flight-feathers interrupted by blacker inner primaries; though two-tone effect of underwings less striking than on congeners, this black strip quite conspicuous against secondaries, which still look palest part of underside; whitish shafts of outer primaries show from above; head yellow, or orange-yellow, with some blue on top. **Juvenile** Similar but for dusky head and bill.

**CONFUSION SPECIES** Long mistaken for Lesser Yellow-headed [3], which, however, is smaller, narrower-winged and relatively shorter-tailed, and glides with strong dihedral and marked rocking action; also has clearer two-tone underwings, often browner plumage and, as adult, less obviously yellow head (though variation can be misleading); the two species are unlikely to be seen together except at forest edge or over immediately adjacent grassland; Lesser also perches lower and seldom soars. In its forested regions, Greater Yellow-

headed may soar or roost with Turkey Vultures [2], which are of similar size and tail length, but slimmer, with narrower wings and, as adults, red heads; Turkey also distinguished by lighter flight with rocking glides, more contrastingly two-tone underwings and no white primary shafts. Black Vulture [1] is all black but for white patches on primaries below (more conspicuous in some races than in others), but quite differently shaped, with longer head, much broader wings, very short tail, and fast stiff wingbeats. See also King Vulture [7].

**VOICE** No information. Any sounds likely to be hisses or croaks inaudible except at close ranges.

**FOOD** Little information, but probably almost entirely carrion. Forest diet likely to include high proportion of carcasses of the abundant sloths *Choloepus/Bradypus*, whose combined total range coincides largely with those of this species and Lesser Yellow-headed [3]. Forages mainly by transect-sailing low over forest and, like Turkey Vulture [2] in similar habitats, locates carcasses of small forest mammals by smell; after initial detection, circles around, drops below canopy and flies from branch to branch or walks on ground until source pinpointed. Dominant over Turkey Vultures at carcasses.

**SOCIOSEXUAL BEHAVIOUR** Mostly solitary or in pairs; rarely in groups, though may feed and roost socially, sometimes with Turkey Vultures [2], over which is dominant at carcasses. No information on displays.

**BREEDING** Little information. Copulation observed in August in French Guiana. Eggs laid in large tree cavity. Clutch 2. Incubation and fledging periods not recorded.

**POPULATION** No data on densities, apart from general assessments: 'Common over extensively forested regions, there greatly outnumbering or virtually replacing Turkey Vulture...Most common vulture away from settled areas in Amazonia' (Hilty & Brown). The available habitat for this essentially forest vulture still runs to 3-4 million km<sup>2</sup>, so a six-figure population seems reasonable, but eventually the species must become increasingly threatened as the forests are felled.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 488-533 mm, ♀ 510-512 mm (two); ♂ tail 252-275 mm, ♀ 272-285 mm (three); ♂♀ tarsus 59-75 mm. Width of central tail-feathers typically 59-70 mm (cf. Lesser Yellow-headed [3]), though some specimens lower. **Weights** 1.17 kg (mean of two).

**REFERENCES** Bernal *et al.* (1994), Blake (1977), Fjeldså & Krabbe (1990), Gomez *et al.* (1994), Graves (1992), Haverschmidt (1968), Hero *et al.* (1992), Hilty & Brown (1986), Houston (1986, 1988, 1994), Meyer de Schauensee & Phelps (1978), Olrog (1985), Shuker (1993), Sick (1993), Tostain (1980), Tostain *et al.* (1992), Wetmore (1964, 1965).

## 5 CALIFORNIA CONDOR *Gymnogyps californianus* (Shaw, 1798)

Plate 5

**DISTRIBUTION** Nearctic (historically 49°N to 32°N, but only 36°N to 35°N by 1980s when remaining few taken into captivity for breeding, then 37°N to 35°N by late 1990s through captive-bred releases); now order 2 back in wild; range once extensive, but greatly reduced

by 1900, extinct in wild 1987-92. North America: formerly at least occurring north into extreme southwest Canada and south into northwest Mexico; in 1800 still evidently fairly widespread west of Rockies, but by 1900 breeding population confined to California; last few

trapped by 1987 for captive-breeding programme and subsequent releases from 1992 onwards in California and north Arizona (see Population).

**MOVEMENTS** Basically sedentary, but observations of wild birds indicated operational range of up to c240 km; and until 1930s individuals occasionally wandered into northwest Mexico (Baja California) and Arizona. Later, radiotelemetry showed feeding movements up to c30 km; and now captive-bred stock have been found to range up to c400 km from release sites.



**HABITAT** Breeding sites in mountains with rugged cliffs and steep slopes; scavenging on ranchland in open foothills with scattered woodland. Californian nests were at 450 to 1,400 m, rarely to 2,000 m. Released birds now range over rocky scrubland, conifer forest and oak savannah.

**FIELD CHARACTERS** Huge cathartid vulture, largely black but for white on wings, with relatively short bill, elongated cere, largely bare and wrinkled or sometimes swollen head (orange-yellow when adult) and neck (redder), leathery ruff, bare crop-patch, long wings, medium-length tail, and shortish legs but big feet. Spends much of time perched preening, or sunning with spread wings, on ledge or branch; walks sedately (sometimes on tarsi), runs, hops; wing-tips reach tail-tip. Sexes similar, but size very variable and female probably averages c8% smaller; juvenile and other immatures distinguished by head and bill colours, and underwings; not adult for six to seven years.

**PERCHED Adult** Body and quills mainly black or blackish, with thin grey shaft-streaks on lanceolate ruff-feathers and inconspicuous brown edges on back and smaller wing-coverts, but greater coverts irregularly tipped white (forming short narrow transverse bar on closed wings) and secondaries edged greyish (shading to silvery wash on innermost); head almost bare, apart from tufty patch of black bristles on forehead between eyes, and mainly yellow to reddish-orange with contrasting whitish bill, but shading to redder on foreneck and crop-patch (see 'Bare parts'), which both distended at times; pinkish to whitish legs. **Juvenile and second/third-year** Perched plumage similar apart from paler feather-edgings above, though white tips to greater coverts generally much narrower (or even absent through wear) and innermost secondaries less grey; but crop-patch, bill and head

dusky, with blackish fuzz on nape and hindneck. **Later immatures to subadult** White tips more conspicuous on greater coverts from third-fourth year; eyes begin to redden, and base of neck shows orange ring first, then extending upwards; but even at subadult stage of fifth year still much dusky-grey on crown and cheeks, so head remains fairly dark. **Bare parts** Adult eyes red, juvenile grey-brown. Adult bill whitish-horn, juvenile dusky. Adult head and cere yellow, or even greyish-yellow, to pink and reddish-orange (colours also vary emotionally and flush redder); juvenile dusky-grey. Adult crop-patch red, juvenile dark grey. Legs dull flesh-pink to whitish. **FLIGHT** Huge raptor with disproportionately small but prominent head, up to seven deeply spotted fingers showing on long broad wings, and medium-length squared or wedge-tipped tail (juvenile more pointed); wingspan 2.3 times total length. Slow stiff beats; after rising in thermal, often precedes glide by bowing wings down until tips almost meet; soars and glides with wings almost level, or sometimes very slightly raised, fingers unevenly brush-like head-on and producing whistling sound. **Adult** Mainly black with bare coloured head but, above, white bar on inner greater coverts and silvery tone to inner secondaries; below, white median coverts and inner greater form long irregular patch thinning out towards carpals and emphasising black leading edges, while pinkish-white legs and, often visible, bare red crop-patch provide further contrast. **Juvenile and second/third-year** More uniformly black with dusky head, but similar pale legs; above, narrower white bar along inner greater coverts and much less grey tone to inner secondaries; below, whitish triangles on wing-linings correspond to adult's, but heavily mottled with black and much less obvious. **Later immatures to subadult** Intermediate; head still looks dark until c6th year, apart from reddish-orange neck-ring, but upperwing-bars broader and underwing-triangles clearer whitish from third-fourth year.

**CONFUSION SPECIES** Almost unmistakable on size alone, while bare coloured head and white wing markings make adult and other older individuals easy enough to identify. Only other cathartid indigenous to California and north Arizona is Turkey Vulture [2] (far smaller, proportionally longer-tailed, distinctive two-tone wings clearly raised in strong V). But see also Black Vulture [1], Golden Eagle [224] and immature Bald Eagle [47] are only other more or less dark North American raptors big enough to cause confusion, and both, again, are far smaller and relatively longer-tailed with feathered head (crown and nape of Golden yellowish); any white or whitish patterning normally quite different from immature condor, though some juvenile Bald Eagles can be almost entirely dark except for white blotches and diagonals on axillaries and wing-linings. Since 1988 some captive-bred Andean Condors [6] (females only, to avoid any risk of colonisation) have been released in California as part of research towards re-establishing present species: size very similar, but tail looks longer and narrower, and wings not so broad, while adult's white ruff and distribution of white on wings quite different, and juvenile all dark with brown (not dusky) head and downy ruff.

**VOICE** Like other cathartid vultures, usually silent but for various grunts, snarls, growls and hisses when feeding or fighting.

**FOOD** Carrion, almost entirely corpses of large mammals, notably deer, cattle, sheep and horses, but Californian ground squirrels *Spermophilus beecheyi* recorded when available in large numbers through poisoning. Not known to kill or even attack live animals, though in 19th century sometimes ate mussels. Forages by soaring, watching for carcasses and gatherings of conspecifics or other carrion-feeders. Dominant over Turkey Vulture [2] and other scavengers.

**SOCIOSEXUAL BEHAVIOUR** Semi-gregarious to inconsistently social: before final population crash, non-breeders would roost in groups of up to c20, several might soar or bathe socially, and numbers would gather at large carcasses. Pair might glide together, but only display involved brief courtship dance by male perched on ledge or thick branch: turning from side to side, or full circle, with wings spread, head bent down and bill almost touching crop-patch (see B&A).

**BREEDING** Used to lay February–May, but nest occupancy then continued for another 7–8 months, even though chick left before it could fly. Pairs nested singly and, if successful, typically only every other year. No material used: egg laid in detritus on floor of cave in cliff face, among boulders on steep slope or, exceptionally, in large cavity at c30 m in giant sequoia. Clutch 1. Incubation c55–60 days. Fledging c6–7 months, but chick may leave nest at c5 months; fed by regurgitation.

**POPULATION** No nests were ever recorded outside California, but early 19th-century distribution stretched more than 2,000 km from southwest Canada (southernmost British Columbia) to northwest Mexico (northern Baja California, where last recorded 1937) and, as individuals apparently sedentary though with range of up to c400 km, breeding distribution presumably extended north at least to Washington state. (Fossil remains show that it, or slightly larger Pleistocene ancestor, once occurred more widely in North America, especially from New Mexico to Florida, Texas and northeast Mexico.) By 1900 breeding was confined to California, and by 1946–47 only c60 remained in southwest, in relatively small upland horseshoe covering 130,000 km<sup>2</sup> north from conjunction of southern Coast Range and southwestern foothills of Sierra Nevada: five nesting pairs, c30 non-breeding adults and c20 immatures.

Adverse factors not fully understood, but doubtless included shooting and, originally more against coyotes and latterly ground squirrels (see Food), poisoning; also ingestion of lead from shot carcasses; later, possibly also fatal collisions with power lines and falling into unfenced oil-drilling sumps, as well as fewer carcasses. By 1982 only 21 remained and, after several adults disappeared in winter 1984/85, just one breeding pair and a few single birds. Extinction loomed and it was agreed to trap these to join the integrated captive-breeding programmes managed by the Peregrine Fund (at the World Center for Birds of Prey), Los Angeles Zoo and San Diego Wild Animal Park; the last was caught in 1987 and there were then 22 in captivity. By 1991 the total was 52, including four taken as nestlings, 13 hatched in captivity from wild eggs, and 25 hatched from captive-laid eggs; another 15 had been hatched by 1993. Meanwhile a reintroduction programme was started in 1992 when the first captive juveniles were released back into the wild in southern California. By the end of 1998 there were 50 captive-bred birds at large (as well as 97 in captivity): 28 of these in California (released at Lion Canyon in Los Padres Natural Forest and Castle Crags on the western border of San Luis Obispo County) and 22 in northern Arizona (released at Vermillion Cliffs and Hurricane Cliffs), but none had yet reached reproductive maturity. It is hoped in due course to establish a third population in New Mexico.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 760–915 mm, tail 380–450 mm, tarsus 110–140 mm. **Weights** ♂ 8.2–14.1 kg.

**REFERENCES** BirdLife International (2000), Borneman (1978), Bruning (1983), Clark & Wheeler (1987), Collar & Andrews (1988), Collar *et al.* (1992), Cox *et al.* (1993), Elliott (1981), Emslie (1987), Ferguson-Lees & Faull (1992), Finley (1906–10), Fisher *et al.* (1969), Friedman (1950), Harris (1941), Howell & Webb (1995), Janssen *et al.* (1986), Johnson *et al.* (1983), Kiff (1983, 1990), King (1978–79), Kotford (1953), Meretsky & Snyder (1992), Palmer (1988), Patter (1987), Peregrine Fund Newsletter (1998), Root (1988), Snyder (1983, 1985), Snyder & Hamber (1985), Snyder & Johnson (1985), Snyder & Snyder (1989, 1991), Snyder *et al.* (1986, 1987), Steadman & Miller (1987), Toone & Risser (1988), Wallace (1989, 1991), Wallace & Temple (1983, 1987), Wallace & Toone (1992), Wheeler & Clark (1995), Wilbur (1975, 1976, 1978).

## 6 ANDEAN CONDOR

*Vultur gryphus* Linnaeus, 1758

## Plate 5

**DISTRIBUTION** Neotropical (11°N to 55°S), mainly in Andean region; order 4/5; now rare and local in northern quarter of range, becoming extinct in some parts, but still frequent, widespread and locally common in central and southern range. Western and extreme southern South America: only sporadic in western Venezuela (Mérida) and exceedingly scarce in Colombia (north also to Santa Marta) and Ecuador, thence south through Peru, western Bolivia, Chile and western Argentina (also Córdoba) down to Tierra del Fuego. (Some captive-bred females were released in California, USA, from 1988 as part of an evaluation of the release

programme for California Condors [5].)

**MOVEMENTS** Probably rather sedentary, but individuals range over considerable areas and in Argentina may sometimes wander over eastern Patagonia; also recorded just over Bolivian border in lowland Brazil, where cattle carcasses accumulated in dry season carried by flooded Rio Jaurú to bay known as 'Isla dos Urubus' (Vulture Island); and noted in west Mato Grosso since 1974 at start of dry season (May/June), along with Black and King Vultures [1/7]. More casual lowland records have been reported from north Colombia (Valledupar), east Bolivia (Santa Cruz) and north Argentina (Santa Fé).



**HABITAT** Needs cliffs for nesting and roosting, and open country for foraging. Mountains with canyons, rocky cliffs and steep slopes, often around and above treeline; in central and southern range, also temperate wooded or grassy hillsides with gorges, and foraging down to coasts; thus, typical of wet grassland and scrub-woodland valleys below snowline in high Andean *puna* zone, and also of rocky Patagonian cordilleras and adjacent thorn-scrub and desert. Although foraging down to sea-level in central and southern range, only above 1,800 m from north Peru northwards, mainly at 3,000–5,200 m.

**FIELD CHARACTERS** Huge cathartid vulture, one of the heaviest of all flying birds, with relatively small bill, bare head and neck wrinkled into loose folds (male also with prominent comb on forehead and pendent dewlap on throat), downy neck-ruff, very large wings and longish tail. Roosts and spends much time perched on cliffs, or standing on rocks or open ground; several records of sun-bathing; wing-tips just short of tail-tip on male, farther on female. Sexes similar in plumage, but male 0–13% bigger (perhaps 10–60% heavier) and easily distinguished by head appendages; juvenile and immature stages quite distinct; not adult until six to eight years old.

**PERCHED** **Adult male** Glossy black but for thick white ruff (not quite meeting across lower throat) and silvery-white secondaries and greater and median coverts forming prominent wing-panels; bare head, neck, comb and dewlap mainly dusky-reddish. **Adult female** Similar, but lacking comb and dewlap. **Juvenile** Dull blackish-brown with paler brown ruff and fuzzy brownish down on nape and neck; male may have slight excrescence on forehead. **Immature** Comb begins to develop on male, then pale wing-panels, but ruff brown until near-adult. **Bare parts** Adult male eyes grey-brown to reddish, female red,

juvenile brown. Adult bill ivory with blacker base, rest of head dull reddish to reddish-grey; juvenile bill yellow-brown to pink-brown, rest of head dusky-brown. Legs dusky, but often whitened by defecation.

**FLIGHT** Immense bulky raptor with prominent head on extended neck, obvious ruff, very long (but not particularly broad) rectangular wings with eight spread fingers, and longish tail; distended crop may hang conspicuously when bird gorged; wingspan 2.6 times total length and, at up to 3.05 m, the greatest of any bird of prey. Active flight typically involves slow, deep flexible beats, but these may have to be much faster and flatter when taking off from ground in windless conditions (once 53 flaps in 21 seconds to rise 14 m over distance of 227 m); glides on flat wings with hands variously angled back, and soars for long periods on more or less level wings (slight dihedral at most) with upcurved fingers. **Adult** From above, white ruff and all-white inner secondaries and larger coverts contrast with black back, tail and forewings, gradually giving way through increasingly black outer secondaries to black primaries; from below, predominantly black with contrasting white ruff and dusky head; comb conspicuous on male. **Juvenile** All blackish-brown with slightly paler ruff and inner upperwings. **Immature** Increasing wing-panels, still brown ruff.

**CONFUSION SPECIES** Adults unmistakable. Despite distinctive size and shape, juvenile might be confused with all-dark juveniles of other South American cathartid vultures, though these much smaller and with different outlines and flight actions. Black Vulture [1] has short tail, broad-based wings with primary patches, and shallow stiff beats mixed with short glides. Turkey Vulture [2], like its congeners [3, 4] which have little overlap in range with Andean Condor, is much smaller and slimmer, and glides and soars on V wings with two-tone undersides. King Vulture [7] has much shorter, squarer wings and tail, and uses stiff shallow beats. South American mountain eagles and large buteonines are not only far smaller and differently shaped, but, if mainly dark, have at least one distinguishing feature, such as tail-band or paler belly.

**VOICE** Generally silent, except in courtship display (see Sociosexual Behaviour), though may utter weak croaking cough. Wind can whistle through extended primaries.

**FOOD** Carrion, usually well rotted, of such mammals as guanaco and domesticated livestock, frequently dead sheep in the Argentine Andes; also, more locally, dead marine mammals and the young and, particularly, eggs of seabirds. Some individuals may possibly also prey on newborn mammals. Forages by random soaring and transect-sailing over grassy slopes and other open ground, and by direct visits to known food sources, such as seabird colonies.

**SOCIOSEXUAL BEHAVIOUR** Usually seen soaring singly, or often in pairs or trios, but larger numbers may feed or roost together; as many as 36 recorded at Peruvian seabird colony, and up to 40 at large carcass. No aerial displays apart from mutual soaring, but in courtship male stands erect, spreads wings to show the white panels and, slowly turning around, utters *tok-tok-tok...* with open bill, at same time arching neck, which, with whole head, turns bright yellow (B&A).

**BREEDING** Little information for wild birds. Egg-laying February–June in Peru and September–October in Chile, and season may be about April–December in Colombia, but individual pairs normally breed only in alternate years. Eggs laid on ledge or in large cavity on high cliff. Clutch 1. Incubation 54–58 days. Fledging c6 months.

**POPULATION** The Andes and associated ranges extend down some 8,500 km and, at their widest, are 700 km across. In the relatively narrow section from north Peru northwards, they have (or, in some parts, had) dense forest down both sides so that feeding condors were restricted to the high grasslands, where, having been regarded as predators of livestock ever since European settlement, they have been reduced to remnant populations by shooting and poisoning: once widespread in Colombia, for example, where formerly up to 60 at one carcass, only 60–70 in all were left by the early 1980s and around 35 ten years later. From north-central Peru southwards, the high mountains and southern uplands are separated from the Pacific shores and seabird colonies of Peru and southern Chile by only a narrow strip of open country – variously now coastal desert, low thorn-scrub and cultivation – as well as being wider and far less forested from Bolivia to Tierra del

Fuego; consequently, though still persecuted where they clash with people, condors have always had better foraging. The total population has been put at thousands only, but surely runs into five figures over that vast range. Apart from shooting and poisoning, there is local evidence of pesticide contamination. The long-term prognosis may not be good, but captive-breeding programmes lead to periodic attempts at restocking and other releases, notably in Peru and southern Colombia.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 800–852 mm, ♀ 757–801 mm; ♂ tail 354–380 mm, ♀ 330–370 mm; ♂♀ tarsus 115–120 mm. **Weights** ♂ c11–15 kg, ♀ c7.5–11 kg.

**REFERENCES** Bender (1980), Black (1977), Calchi & Vilorio (1991), Canevari *et al.* (1991), de la Peña (1992), Ellis *et al.* (1984), Fjeldsa & Krabbe (1990), Gailey & Bolwig (1973), Gini (1950), Gner (1976), Hilty & Brown (1986), Jaksic & Jiménez (1986), Johnson (1965), Kratler *et al.* (1993), Lint (1950, 1959, 1961), Mann (1980), McGahan (1971a/b, 1975a/b/c/d), Meyer de Schauensee & Phelps (1978), Murphy (1925), Naroosky & Yuznetz (1987), Norton (1975), Pennycuik & Scholey (1984), Poulsen (1951, 1974), Sick (1979, 1998), Stiles & Skutch (1989), Temple (1985), Temple & Wallace (1989), Turner (1975), Wallace MP (1989), Wallace & Temple (1987, 1988), Wilbur (1984), Zonfrillo (1977), Zwart & Lounman (1980).

## 7 KING VULTURE

*Sarcoramphus papa* (Linnaeus, 1758)

Plate 5

**DISTRIBUTION** Neotropical (19°N to 34°S); order 5; widely but sparsely distributed and becoming rarer in many areas with deforestation and human settlement. Central and tropical and subtropical South America: from south Mexico (Istmo de Tehuantepec through Chiapas to southernmost Yucatán and Belize) patchily through Central America (in Costa Rica, for example, fairly common Peninsula de Osa, uncommon to rare elsewhere) to, west of Andes, Ecuador (now very rare) and northwesternmost Peru and, on eastern side, through Colombia, Venezuela, Guianas, Brazil, east Peru, Bolivia and Paraguay to northern Argentina (south to Córdoba) and north Uruguay; found on Coiba (Panama) and other larger offshore islands, perhaps formerly including Trinidad (last recorded 1942).

**MOVEMENTS** Mainly sedentary, but ranges over large areas. In north Argentina, wanders occasionally well outside restricted breeding distribution and has reached Santa Fé and northeast Buenos Aires (most recently in 1985); in north Colombia, sometimes attracted to unexpected places by migrant flocks of Black and Turkey Vultures (1/2), perhaps because they give erroneous impression of gathering for food. In Mexico, formerly recorded north to Sinaloa and Puebla; and probably even vagrant north to Florida in 18th century (see Palmer).

**HABITAT** Mainly dry or humid tropical forest and other well-wooded areas in lowlands and, perhaps especially, premontane foothills, but generally well away from human settlement; also forages, apparently to differing extents in different regions, over partly cleared woodland, chaco, savannah, and even cattle-ranches and coastal

grassland. Mainly sea-level to 1,500 m, but on east side of Andes locally to temperate altitudes at 2,500 m, occasionally wandering to 3,300 m.



**FIELD CHARACTERS** Medium-sized, solid-looking cathartid vulture, pied or black in plumage, with rather heavy bill, bare corrugated head (when adult, colourful with fleshy wattles) and short tail. Perches in trees, high in canopy, where easily overlooked: said to squat with

head lowered; often sunbathes with spread wings; wing-tips exceed tail. Sexes similar, but male averages slightly larger and has bigger and more pendent caruncle at base of bill; juvenile and immature stages over four to five years quite distinct.

**PERCHED Adult** Predominantly creamy-white, tinged pinkish-buff above, apart from black flight-feathers, greater upperwing-coverts, and rump to tail; dusky-grey to blackish ruff at base of bare neck sets off multi-coloured head of oranges, yellows, reds, blues, violets and mauves, black-bristled on top and corrugated on sides (see 'Bare parts'). **Juvenile** All sooty-black, eventually with some obscure whitish mottling on underbody and wing-linings; bare head blackish but for variable reddish tinge on bill and neck. **Second/third-year** Still sooty-black above, but increasingly white underparts; caruncles developing and head and neck now partly orange and red. **Third/fourth-year** Underparts all white; wing-coverts, scapulars and, later, mantle also increasingly mottled white; head colours stronger. **Fourth/fifth-year** Mantle and, finally, back turn white, and caruncles and head colours become increasingly as adult. **Bare parts** Adult eyes white (with red orbital rings), juvenile brown, immature yellow-grey to whitish. Adult bill orange-red with black base, juvenile black with reddish tinges. Adult's lobed caruncle at bill-base, rear crown and bare neck all predominantly yellow and orange-red, rest of head more or less contrastingly dark with violet or mauve to dirty blue-grey pendent lore-lobes and corrugated cheeks, but also bare pinkish pendent crop; juvenile head black with some orange-red tinges and only rudimentary caruncles. At all ages, legs dusky and yellow, often whitened by defecation.

**FLIGHT** Largeish bulky raptor with broad squarish-tipped wings showing seven to eight long thin fingers, short broad tail, and smallish head which can almost disappear ('headless' look) in front of dark ruff; wingspan 2.4 times total length. Takes off with heavy beats mixed with short glides (vaguely recalling Black Vulture [1]), and sails and soars, often very high, on more or less level wings with up-swept tips; 'drops from sky at tremendous speed with noisy wings' (Palmer). **Adult** Both above and below, creamy-white forewings and body contrast with black flight-feathers, greater wing-coverts and tail (with rump), and grey-black ruff; coloured head often less conspicuous. **Juvenile** All dark, sometimes with little white mottling below or reddish tinge apparent on head. **Immatures** Body and forewings increasingly white, first below and then above as well.

**CONFUSION SPECIES** Adult and immature stages unmistakable, more likely to be confused with Magnari Stork *Ciconia maguari* or, in northern winter, Wood Stork *Mycteria americana* than with any raptor. Juvenile plumage resembles those of other South American vultures, but shape and action different: Black [1] considerably smaller and still shorter-tailed, with more or less conspicuous primary-patches on less square wings, and has faster, shallower beats on take-off; Turkey and Yellow-headed [2/3] have longer and thinner wings and tail with two-tone underwings and marked dihedral when gliding or soaring; Greater Yellow-headed [4] also flies on level wings, but has longer tail and distinctively patterned flight-feathers; Andean Condor [6] much larger and quite differently shaped. All *buteos*, *buteonines*

and eagles, apart from being smaller, have some patterning on tail or underwings.

**VOICE** Guttural grunts and whistling hisses in courtship; low croaks and bill-snapping when nest threatened.

**FOOD** Wide variety of carrion. Sometimes several gather at large carcass, with or without other vultures, but dead vertebrates eaten range in size from cattle down through monkeys and other arboreal mammals to reptiles and stranded fish. In densely forested areas, mammals likely to include many of the abundant sloths *Choloepus/Bradypus* whose combined ranges coincide largely with that of this vulture, but elsewhere it has adapted well to domestic livestock. Said at times to kill newborn calves, wounded animals, and small reptiles. Forages by soaring and transect-sailing at moderate heights over both forest and more open country, sometimes especially along rivers. In forested areas, apparently watches low-flying Turkey and Greater Yellow-headed Vultures [2/4], then follows them down among the trees; also believed by some to hunt by scent low over canopy, but sense of smell questioned after experiments with caged birds.

**SOCIOSEXUAL BEHAVIOUR** Nowadays usually seen singly or in pairs; locally, up to ten or more loosely together; in former times 50+ recorded at one carcass. At carcasses, dominant over most other vultures (hence name). Apart from mutual soaring, courtship takes place on tree perch, cliff ledge or ground, and involves circling or advancing and retreating, opening and closing wings and flapping and trembling them when spread, and bowing head to show coloured crown, then stretching it up, all this accompanied by grunts and whistles (see Voice). Both adults and immatures also play with their crops, which become distended into large bare red and grey or reddish-grey balls respectively. Pair with nest in low stump advanced, croaking, close to intruder and, with wings and tail fully spread, rocked from side to side and snapped their bills 'like great owls'; at nest high in tree, adults seldom seen and then only perched nearby or moved nervously from branch to branch.

**BREEDING** Few data in wild. Nests occupied almost any month, but perhaps laying peak at end of rains and beginning of dry season: eggs variously recorded February–July and October–December, young January–August. Variety of sites, including tree cavities (one at 10.5 m), forest cliff ledges, large old nests of other birds, low rotten stumps (one at 0.3 m), and scrapes in leaf-litter on ground at bases of trees. Clutch 1 (1–2). Incubation 50–58 days. Fledging 72–86 days.

**POPULATION** Although widespread, with distribution enclosing over 12 million km<sup>2</sup>, range becoming increasingly fragmented in many areas. In Mexico, deforestation has destroyed much of its habitat. In wooded Central America, where it was commonest (and sometimes only) vulture, now generally becoming uncommon to rare. Though still regular in north, northeast and central Brazil, increasingly scarce in many other parts, due perhaps mainly to deforestation and trophy-hunting: at end of 19th century, for example, found throughout the forested uplands of the three southeastern states of Brazil that total over 0.5 million km<sup>2</sup>, but now rare there and confined to just two separate areas of a few thousand km<sup>2</sup> apiece. Over whole range, five-figure population

still seems possible, but the species will be increasingly threatened as the forests disappear. Lead poisoning recorded in captive birds.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 482–525 mm, ♀ 480–508 mm (two); ♂ tail 207–257 mm, tarsus 90–95 mm. **Weights** ♂♀ 3–3.75 kg; captive immature 3.78 kg.

**REFERENCES** Antas & Silveira (1980), Berlanga & Wood (1992), Blake (1977), Canevari *et al.* (1991), [Clinton]-Eitner (1981, 1984, 1985, 1987, 1989), Contreras *et al.* (1990), Cuneo (1968), de Antas & da Silveira (1980), Decker *et al.* (1979), de

la Peña (1992), Fischer (1963, 1974), Fjeldså & Krabbe (1990), Grier (1976), Harper (1936), Haverschmidt (1968), Hilty & Brown (1986), Houston (1984, 1988), Howell & Webb (1995), Koester & Koester-Stoewesand (1978), Kurz (1970), Lemon (1991), Lundy (1957), Meyer de Schauensee & Phelps (1978), Narosky & Yzurieta (1987), Olrog (1985), Palmer (1988), Perez-Higareda (1981), Ramo & Busto (1988), Reid (1989), Ridgely & Gwynne (1989), Ruschi (1979), Schlee (1987), Sick (1979, 1993), Slud (1964), Smith (1970), Stager (1964), Stiles & Skutch (1989), Swann (1924–45), Temple & Wallace (1989), Thiollay (1985, 1989a/b), Tostain *et al.* (1992), Turner (1973), Wallace & Temple (1987), Wallace *et al.* (1985), Wetmore (1965), Wilbur (1984), Zwart & Louwman (1980).

## ORDER ACCIPITRIFORMES

### Family Pandionidae (osprey)

#### 8 OSPREY

*Pandion haliaetus* (Linnaeus, 1758)

Plate 6

Other name: Fish Hawk

**DISTRIBUTION** Nearly cosmopolitan in occurrence, but breeding almost entirely Holarctic (70°N to 16°N) and Australasian (2°N to 36°S), marginally also northern Neotropical (27°N in West Indies to 17°N in Central America), extreme northeastern Afrotropical (22°N to 12°N), and northern and eastern Indomalayan (34°N to 11°S); thus, largely absent as breeder from mainland tropical and south temperate parts of Americas, Africa and continental Asia, though farthest migrants reach south to c42°S in South America and 35°S in South Africa; order 5; varies from common to rare and local in different parts of range. Breeding areas may be divided into three. (1) New World from north-central Alaska and much of boreal Canada east to Newfoundland, south through Great Lakes and down Atlantic coast of USA to Florida and Louisiana, more uncommonly down Pacific coast (and very locally inland as far as western parts of Montana, Wyoming, Colorado and New Mexico) to – more numerous again, even if still locally – coasts and islands of Baja California and Gulf of California south to Tres Marias; also coasts and cays of eastern Mexico (Quintana Roo) and Belize, as well as Cuban cays and Bahamas. (2) In Old World mainly from Scotland (recolonised and increasing), south Norway, Sweden, Finland, northeast Germany, Poland, Baltic Republics and Belarus across much of subarctic and temperate Russia to Kamchatka, Kuriles, Sakhalin and Japan; otherwise absent from almost all of west and central Europe (except small numbers Balearics and Corsica and odd pairs Portugal and, only recently again, France), but local, isolated or remnant populations Cape Verde and Canary Islands, northwest Africa (coastal Morocco and Tunisia), islands in Gulfs of Suez and Aqaba, Red Sea and Persian Gulf, Ukraine (very few), south Caspian (probably now extinct Caucasus), lakes and rivers of Kazakhstan, Himalayan India (Ladakh, Kashmir, Kumaon, Assam), coasts and hinterlands of

central and southeast China, and Taiwan, Hainan and Philippines. (3) Sulawesi, Moluccas, Java and Lesser Sundas through mainly coastal New Guinea to Bismarck Archipelago, New Britain, some Solomon Islands, New Caledonia, and coastal Australia.

**MOVEMENTS** Populations of Nearctic America and Palearctic Eurasia almost entirely migratory, except in northwest Mexico (few also overwinter south California and coastal Texas), southernmost Florida, and much of Japan (north to Honshu). Those of Caribbean and Atlantic islands (Cape Verdes, Canaries) probably sedentary, and adults present year-round in western Mediterranean (Morocco, Algeria, Balearics, Corsica), Red Sea area (including Gulfs of Suez and Aqaba), Persian Gulf, and southeast China, though these not necessarily same individuals in both summer and winter. Those of Philippines, Sulawesi and Java almost certainly sedentary, but numbers increased by Palearctic immigrants during northern winter and, at least in Sulawesi, by others from south, presumed to be wanderers from Australia. The species is also resident in Moluccas, Lesser Sundas, Bismarck, Solomons and New Caledonia, as well as coastal New Guinea and Australia, where range expands somewhat southwards and inland along rivers in non-breeding season. Holarctic migrants start south in mid August, are typically on passage mid September–mid October (end August–November) and begin arriving in winter quarters in October, leaving again March and returning to breeding areas late March through April. Generally migrates singly (rarely small parties, up to nine on record), and not too dependent on land bridges, so movements unspectacular. Most North American birds winter near coasts and, to lesser extent, well inland in Central and northern South America (c32°N to 18°S); from north Mexico (few California and Texas), down on Pacific side to Peru with some as far as south-central Chile (Los Lagos), and on Caribbean and Atlantic side to north Brazil, some reaching Uruguay and northeast



Argentina; inland, may occur almost anywhere in northern South America, but especially Colombian valleys and western Amazon basin. Eurasian birds migrate mainly to sub-Saharan Africa (some evidently crossing central Sahara, where no suitable food), coastal Arabia, Indian subcontinent and southeast Asia into Philippines, Sulawesi, Borneo, Sumatra and, uncommonly, Java; apart from small numbers in Mediterranean region, Red Sea and Persian Gulf, and those in northern Indian region, most migratory populations winter in relatively narrow band between tropic of Cancer and equator ( $23.5^{\circ}\text{N}$  to  $0^{\circ}$ ), though in Africa some do travel, mainly on east side, right down to Cape Province. Most immatures stay in winter quarters, or move up only as far as southern fringes of breeding range, for first-summer and sometimes also for second (latter, which may indulge in display-flights, are probably cause of occasional unconfirmed reports of breeding in South America and sub-Saharan Africa). Oceanic migrants and wanderers regular in western Pacific on Russian Komandorskiya islands, various Japanese outlying groups of Izu, Ogasawara, Kazan, and Daito, and down Nansei-shoto; old records also for Guam and Palau, and species considered 'rare but regular winter visitor' to Hawaiian Islands, likewise to Galapagos; vagrants have also reached Greenland, Iceland, Faroes, Azores and Madeira in Atlantic, and Seychelles in Indian Ocean.

**HABITAT** Essentially associated with water, salt or fresh, which must be reasonably clear and calm, at least sheltered or slow-moving, with surface-swimming fish: tropical and subtropical islets, any shorelines from cliffs to saltflats - though sheltered bays, estuaries, mangroves and brackish coastal lagoons often preferred - and lakes, reservoirs, rivers, wooded swamps with open water, and at times relatively small or narrow streams, canals or ponds, even in built-up areas. Nests usually close to coasts, lakes or large rivers, or surrounded by water on

islets or flooded trees, but sometimes up to several kilometres from any water. Mostly sea-level to 1,000 m, but breeds locally to 3,800 m and recorded fishing at up to 4,100 m on migration.

**FIELD CHARACTERS** Largish water-associated fish-eating hawk, more or less white-headed and dark-masked, otherwise mainly brown above and white below, with strong bill, prominent head (often looks small unless hackles raised into nuchal crest), long pointed wings, not particularly short tail, and stout, heavily-scaled legs that appear longer than they are; adaptations for catching, holding and eating fish include elongated upper mandible, rather forward-directed eyes, dense oily plumage, big feet, reversible outer toes, and spiculate soles. Perches conspicuously, upright or hunched, on tree tops, dead branches, dead trees standing in water, fishing stakes, posts, islet rocks, cliffs, or artificial structures, sometimes on ground but not walking; frequently watches at water's edge; wing-tips usually just exceed tail-tip, but fall short in sedentary southern populations. Sexes similar and, though female averages only 3-4% larger and perhaps 14% heavier, often separable on both bulk and plumage detail when pair-members together; juvenile distinguishable on good view in fresh or fairly fresh plumage; as adult by c18 months.

**PERCHED Adult** All dark brown above (tail slightly paler and thinly white-tipped), apart from finely dark-streaked creamy-buff to whitish rear crown and nape contrasting with more or less dusky forehead and brown eye-stripes extending down sides of nape to join hindneck (Australasian population has thinner stripes and plainer and more extensive white from forehead to nape, and Caribbean is largely white-headed with only rudimentary stripes; see Geographical Variation); underbody all white, apart from more or less distinct breast-band of rusty-buff to brown streaks (often much reduced in Searctic population, intermediate in Caribbean, more

mottled in Australasian; see Geographical Variation; but, as general though not reliable rule, gorget tends to be wider and streaks heavier on females and may be absent on males, particularly in North America); undertail whitish and dark-banded. **Juvenile** Rather similar, especially below, but crown and nape more heavily dark-streaked (and often tinged rufous at first), brown upperparts look scaled with cream to pale rufous-buff tips, and tail has much wider white tip; Eurasians tend to have narrower breast-band more mixed with white, Americans almost plain chest simply washed with rufous at first, and Australasians heavier streaking and broader breast-band. **First-year** As pale tips wear off, and first gradual moult begins (not completed for 15–18 months), becomes increasingly like adult, though broader white tail-tip often still discernible. **Bare parts** Adult eyes brownish-yellow to bright yellow; juvenile red or orange to brownish-yellow, darker than adult. Cere and legs dull pale blue-grey.

**FLIGHT** Largeish raptor of small eagle size with well protruding head (often looks upcurved in level flight, partly effect of eye-stripes), broad-armed but narrow-handed wings, and squared or slightly rounded tail (elongated narrow hands make wings look relatively longer and thinner, and tail shorter); wingspan 2.6 times total length. Slow, strong steady beats, not particularly deep and quite flexible, mixed with long gull-like glides on arched wings, wrists raised and thrust forward, rather pointed hands angled down and back; soars on bowed or, sometimes, flat wings; frequently hovers when hunting and, apart from fish-eagles [42–51], is only raptor that regularly plunges feet-first into water (other fish-eaters usually immerse feet only). **Adult** All dark brown above, apart from slightly paler and thinly white-tipped tail, and usually conspicuous whitish or white head with, in different races, variably dark forehead and broad or narrow eye-stripes more or less continuing on to nape (see Geographical Variation); highly variable rufous-buff to brown streaks on chest (in Old World forming clear gorget, usually broader on females, but in Americas often inconspicuous or absent, especially on males); otherwise, underbody and wing-linings conspicuously white in contrast to bold black carpal patches and less distinct blackish diagonals across inner wings (dark streaks on greater coverts) behind one to two rows of dark spots (on median coverts); inconspicuously barred flight-feathers and tail tend to look greyish, but primary bases paler and wing-tips brown. **Juvenile** From above, distinguished by scaled appearance of body, scapulars and smaller wing-coverts, and pale lines along medians and greater, all caused by cream to rufous-buff feather-tips, as well as more broadly white-tipped tail and, in most races, more dark-streaked crown, very like adult from below, but for whitish mottling on black carpals, more clearly barred and whitish-tipped tail, slightly paler secondaries and, in gorgeted races, chest-band more mixed with white; in fresh plumage, crown, nape, chest and wing-linings may be tinged rusty-buff, but this fades quickly; when pale tips on upperparts wear off, immature difficult to separate from adult.

**CONFUSION SPECIES** Shape, plumage and behaviour usually make identification easy. In North America, Bald Eagle [47], which also plunges after fish in similar habitats, has subadult stage with dark eye-stripes on whitish head and already pale yellow eyes (but is much

larger, bulkier, differently proportioned, with mottled tail and underparts). Likewise, through associations of habitat and fishing behaviour, juvenile African Fish-eagle [44] and, from southeast Asia to Australia, immature White-bellied Fish-eagle [42] might just conceivably cause confusion (but, again, both are larger and bulkier, with blotched or mottled underbody, less suggestion of any mask, and brown eyes); consider also moulting juvenile Brahminy Kite [41]. Sizeable raptors which show much white below in flight, such as some of the snake-eagles *Circus* and smaller hawk-eagles *Hieraeetus*, and also whitish buzzards *Buteo* and honey-buzzards *Pernis* with dark carpal patches, are all quite different in wing shape, proportions, flight actions and behaviour, as well as lacking uniformly dark back and upperwings and strikingly white underbody and linings, and do not have white head with black mask. Indeed, distant flying Osprey, with its long, narrow, angled wings, more likely to be overlooked as large dark-backed gull *Larus* than confused with any of these.

**VOICE** Usually silent away from nest area, but noisy in display-flights, soliciting, and when neighbours, other raptors or human intruders near nest. Basic call is series of 4–20 short clear notes varying in speed, pitch and intensity, and rising, falling or wavering, according to circumstances; resulting sounds range from clear whistles to chirps, yelps, squeals or softer, harder or more staccato or guttural notes.

**FOOD** Almost entirely live fish of locally available surface-swimming species, salt- or freshwater, 7–57 cm long and mostly 100–300 g in weight (50 g to 2 kg recorded); rarely scavenges dead or dying fish. Far more occasional prey items – perhaps taken when abundant, or when fish scarce or hunting conditions poor, or possibly more by inexperienced juveniles – include small mammals, mainly injured or sick birds, turtles and other reptiles, frogs, and crustaceans. Does not normally attempt food-piracy, but may be robbed of prey by other raptors or even herons (*Ardeidae*). Sometimes still-hunts from perch, but mainly forages in flight, flapping and gliding, or soaring in circles, usually at 10–30 m (5–75 m), periodically hovering, sometimes dropping from greater heights in series of stages or steps. Final plunge on half-closed wings can be anything from almost vertical, when may submerge completely, to nearly horizontal, when just breaks surface. In any event, brings legs down and forward just before entry; heavy tarsi with large feet, reversible outer toes, long curved claws, and spiny soles are all adaptations to grasping slippery prey. Carries fish, usually (not always) head forward, to open perch or bare ground and eats it piecemeal.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary, occasionally polygynous, but in some areas loosely colonial (North America, Red Sea) and up to 300 pairs recorded on islands of 700–1,200 ha; occasionally small parties on migration (up to c.10), or may be loosely gregarious when feeding and roosting outside breeding season (up to c.25). Single and mutual high-circling frequent, sometimes several pairs together where colonial. Aerial chases also occur, both in play by pair and in aggression against intruding neighbour; latter may result in strikes or talon-grappling down to ground. Main aerial displays tend to involve carrying fish or nest

material. Simplest is high-hovering by either sex: awkward-looking with flapping wings, spread tail, dangling legs, and much calling. Male also hovers in sky-dance, at peaks of undulations in rollercoaster flight, which may last for several minutes: after rising to considerable height by fast flapping, hovers briefly, then dives and shoots up, hovers again and repeats; also hovers when descending in stepped stages.



Fig. 21. Ospreys *Pandion haliaetus* nesting on specially constructed cartwheel platform, Florida, USA.

**BREEDING** Late May–early September in north of Holarctic breeding range, and mid March–July at southern edges, but from December in Red Sea and December or January in Cape Verdes; July–November in northern Australia, October–February farther south. Substantial structure of small branches and twigs, seaweed, reeds, grasses, heather, even bones and driftwood, 1.2–1.5 m a crown and, often re-used annually, growing from perhaps 50 cm deep to 2 m, lined with finer grasses and moss; typically at 5–30 m in crown or on bare lateral branch of lone or forest tree (in some areas, especially mangrove, swamp cypress, or flooded dead), or on ledge of cliff, rock, electricity pylon, large floating buoy or ruined building, locally on bush or ground of islet; in some areas also increasingly on artificial platforms specially provided. Clutch 2–3 (1–4). Incubation 34–43 days. Fledging 44–59 days; independence 30–60 days later.

**POPULATION** Though one of only two raptors occurring regularly in all six habitable continents (as well as on many smaller island groups), and with breeding range enclosing more than 25 million km<sup>2</sup>, everywhere limited by scattered nature of waterbodies and restrictions of linear rivers and coastlines (almost entirely coastal below c40°N and through Australasia). In Europe, densities in smaller areas of suitable habitat can be very high, with records of five nests along 1,250 m of power lines and 12 pairs in 50 km<sup>2</sup>, but over more extensive areas (exceeding 1,000 km<sup>2</sup> in size) only 1–4 pairs/100 km<sup>2</sup> recorded. World figure put at 25,000–

30,000 pairs in 1980s (Poole 1989), but probably higher by late 1990s, when regional estimates included 7,000–9,000 in north Europe (mainly Sweden, Finland and Russia) and 7,000 in Asiatic Russia. Certainly species increasing in many regions now, but earlier marked declines through human persecution from 18th to mid 20th centuries, especially in Europe, and some dramatic population crashes from pesticide pollution in 1950s and 1960s, particularly in North America. Education, protection, provision of artificial nest sites, and pesticide bans have enabled recovery in parts of northern Europe (Scotland, recolonised in 1950s after extinction nearly 50 years earlier, held 100+ pairs by mid 1990s) and North America (some populations in northeastern USA crashed to c10% by 1970, but had recovered to 50–60% by 1990); a small recolonisation of mainland France also began in 1984. But some resident insular and isolated migratory populations of Caribbean, eastern Atlantic, western Mediterranean, Red Sea, Persian Gulf, inland south-central Asia and coastal China are small and vulnerable. Numbers are still shot on migration (in Mediterranean region, 25–30 in 1986 and 50–60 in 1991 on Malta alone), and effects of pesticides in winter quarters in Africa and South America unclear.

**GEOGRAPHICAL VARIATION** Four races recognised.

*P. h. haliaetus* (Scotland and mainland Eurasia east to Kamchatka and Japan, south locally to Cape Verdes, Mediterranean, Red Sea, Persian Gulf, Himalayas, southeast China and Taiwan; almost entirely migratory except at these southern limits, wintering south through Africa, coastal Arabia, southeast Asia, Greater Sundas and Philippines) Large; some colour on crown, pectoral band more or less complete.

*P. h. carolinensis* (North America south to Florida and Mexican Gulf of California; largely migratory except in last two areas, wintering Central and South America south to central Chile and Argentina) Slightly larger; crown whiter, chest whiter with at most scattered streaks, back and wings darker brown.

*P. h. ridgwayi* (Bahamas, Cuban cays, Yucatán and Belize; more or less sedentary) Smaller; still whiter-headed with reduced eye-stripes and only streaks on hindneck, even less streaking on chest.

*P. h. cristatus* (Sulawesi and Java east to Solomons and New Caledonia and south to coastal Australia) Usually described as smallest race, particularly so in tropical northern parts, but primarily shorter-winged; white of head extends to hindneck, so narrow dark eye-stripes extend down neck-sides to join variably mottled chest-band; smallest northern Australasian populations often separated as '*melvillensis*' and those of New Caledonia and northeast Australia sometimes further subdivided as '*microhaliaetus*', but distinctions doubtfully valid.

**MEASUREMENTS** *P. h. haliaetus* ♂ wing 448–495 mm, ♀ 470–518 mm; ♂ tail 170–210 mm, ♀ 194–240 mm; ♂♀ tarsus 52–57 mm. *P. h. carolinensis* ♂ wing 462–506 mm, ♀ 488–518 mm; ♂ tail 212±8 mm, ♀ 228±6 mm. *P. h. ridgwayi* ♂ wing 433–483 mm, ♀ 455–495 mm. *P. h. cristatus* ♂ wing 384–463 mm, ♀ 410–490 mm; ♂ tail 166–210 mm, ♀ 179–208 mm; ♂♀ tarsus 56–66 mm. **Weights** *P. h. haliaetus* ♂ 1.12–1.74 kg, ♀ 1.21–2.05 kg; *P.*

*h. carolinensis* ♂♀ 1.0–1.80 kg; *P. h. cristatus* ♂ 990 g–1.08 kg, ♀ 1.20–1.91 kg.

**REFERENCES** Ahlgren & Eriksson (1984), Ali & Ripley (1978), Ames (1964, 1966), Bent (1957), Bird (1983), Birkhead & Lessells (1988), Blake (1977), Boshoff & Palmer (1983), Bouvet & Thibault (1980), Brazil (1991), Bretagnolle & Thibault (1995), Brown *et al.* (1982), Brown (1979), Brown & Waterston (1962), Clancy (1989, 1991, 1995), Clark & Wheeler (1987), Coates (1985), Cramp & Simmons (1980), Copper & Copper (1981), de la Peña (1992), Delgado *et al.* (1990), Dennis (1983), Dickinson *et al.* (1991), Edwards (1988), Eriksson (1986), Etchécopar & Hùe (1978), Falkenburg *et al.* (1994), Fjeldså & Krabbe (1990), Fleming (1987), Flint *et al.* (1984), Forsman (1999), Genshol (1986, 1995), Gerrard *et al.* (1976), Ginn *et al.* (1989), Glutz von Blotzheim *et al.* (1971), González *et al.* (1992), Green (1976), Greene (1987), Grubb (1977), Hagan & Walters (1990), Hagemeyer & Blair (1987), Handrinos & Demetropoulos (1983), Henny (1985), Henny & Wight (1969), Hollands (1984), Jamieson & Seymour (1983), Johnsgard (1990), Kemp & Kemp (1998), Kennedys (1973), Kern (1976), Kirkconnell & Garrido (1991), Krystantus (1993), Kushlan & Baw (1983),

Macleay (1993), McCoy (1966), Marchant & Higgins (1993), Marr (1987), Mathison (1976), Medway & Wells (1976), Melquist *et al.* (1978), Meyburg & Meyburg (1987), Meyburg & van Balen (1994), Newton (1979), Odsjö & Sondell (1976), Ogden (1975, 1977), Olsen & Marples (1993), Olsen *et al.* (1993a/b), Österlöf (1977), Palmer (1988), Pickford *et al.* (1989), Poole (1985, 1989), Poole & Agler (1987), Portelli (1994), Postupalsky (1989), Preatoni (1983), Reese (1969, 1977), Richardson (1990), Roberts (1991), Rogacheva (1992), Rogers & Leatherwood (1981), Rymon (1980), Schaadt (1991), Schaadt & Bird (1993), Sick (1993), Shirahai (1996), Shirahai & Christie (1992), Slud (1964), Smith (1985), Smythies (1981, 1986), Snyder & Snyder (1991), Spitzer (1989), Spitzer & Poole (1980), Spitzer *et al.* (1978), Stager (1958), Steidl & Griffin (1991), Steyn (1982), Struthers (1955), Swenson (1979, 1981), Tait *et al.* (1972), Terrasse & Terrasse (1977), Thibault & Patrimoine (1991), Tisbechkin & Ivanovsky (1992), Tucker & Heath (1995), Ueoka & Koplin (1973), Utrendörfer (1952), van Balen (1994), van Marle & Voous (1988), Vaure (1965), Wells (1989), Westall (1984), Wheeler & Clark (1995), White & Bruce (1986), Wiemeyer *et al.* (1984, 1987, 1988), Wiley & Lohrer (1975), Witherby *et al.* (1959), Zarn (1979).

## Family Accipitridae

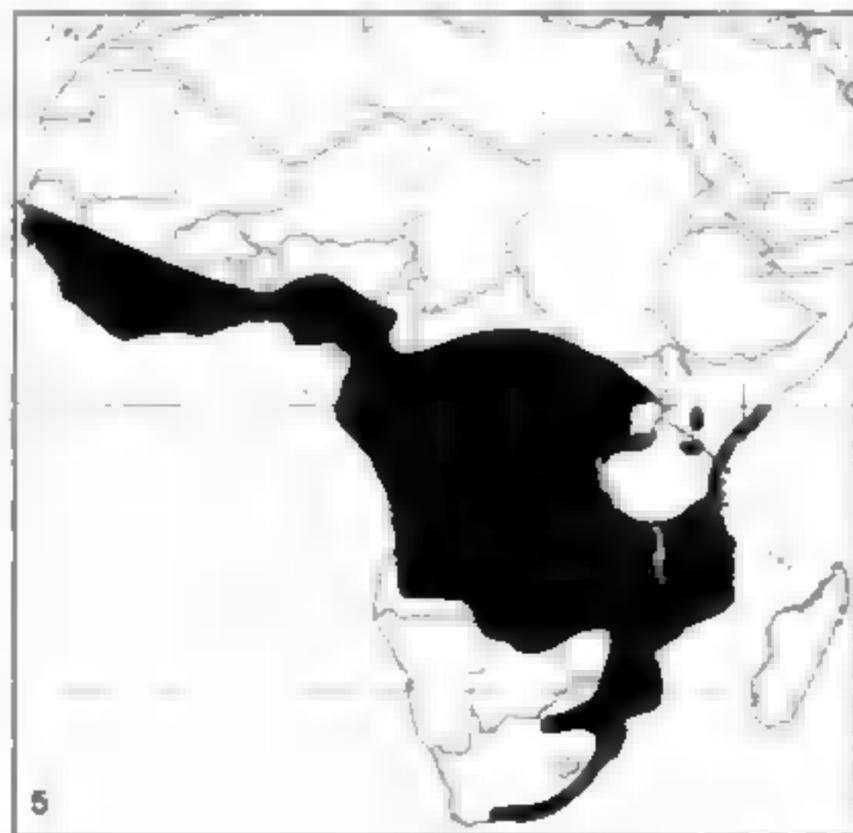
### (a: bazas, honey-buzzards, atypical kites)

#### 9 AFRICAN CUCKOO-HAWK *Aviceda cuculoides* Swainson, 1837

Plate 8

Other names: African Cuckoo-falcon, African Baza

**DISTRIBUTION** Afrotropical (13°N to 34°S); order 5; widely but thinly distributed. Sub-Saharan Africa: Senegal east to north Nigeria, north Congo and south-west Ethiopia, south to Angola and north Namibia and, on the east side, to east Uganda and Kenyan highlands, and from coastal Kenya (where mainly non-breeding visitor) and Tanzania south to coastal eastern and southern South Africa.



**MOVEMENTS** Perhaps mainly sedentary, but some wander into non-breeding areas in South Africa and northwards in East Africa during April–November, especially in July–September. At these times, often less secretive, so appearing more numerous.

**HABITAT** Forest, riverside galleries, humid savannah woodland and, especially in southern Africa, eucalyptus and pine plantations; sometimes enters and breeds in suburban gardens. Also drier woodland and bush during migratory movements in East Africa. Sea-level to 3,000 m.

**FIELD CHARACTERS** Smallish, secretive, rather plump-bodied kite with, mainly because of 'cuckoo pattern', some superficial resemblance to accipiters, but with longer wings, shorter tail, short legs and weak feet; small flattish head with slight crest and no eyebrows, prominent and rather bulgy yellow eyes. Perches somewhat horizontally in trees, sometimes conspicuously on top, but usually inside canopy, often with wings slightly drooping; wing-tips reach well down tail (to middle of subterminal black). Sexes rather similar, but separable, female 4% larger; juvenile and second-year quite distinct.

**PERCHED Adult male** Grey head to mantle and chest, with blacker crest and small patch of chestnut on upper nape; otherwise blackish-brown above, and white with broad bars of dusky-edged chestnut below; predominantly black tail with three grey bands and grey-white tip. **Adult female** Rather browner above, with broader grey bands on browner tail, and less clearly barred with

paler chestnut below. **Juvenile** Brown above, all clearly edged buff to rufous-buff, with conspicuous white supercilia extending back diffusely into the crest and nape; and all white below, including throat and chest, with irregular drop-shaped spots and blotches, strongest on flanks. **Second-year** After intermediate stage, in which white throat and breast are heavily overlaid 'with broad, spade-shaped, rufous-brown spots' and rest of underparts 'a mixture of brown barring and spotting' (Steyn) has rufous wash to chest and finer green barring on rest of underbody. **Bare parts** Adult male eyes orange-red (at least when breeding); female yellow; juvenile grey at first but greenish-yellow after 6 months. Bill black with 'double-toothed' upper mandible. Cere greenish-yellow and feet yellow, both duller on juvenile. **FLIGHT** Smallish raptor with small head, quite broad wings narrowly rounded at tips, giving somewhat pointed effect, and medium-length tail; wingspan 2.2 times total length. Flight quite graceful and, considering the bird's superficially accipitrine appearance and more falcon-like wing shape, wingbeats seem surprisingly slow and floppy, though action illustrates kite relationships; head often slightly raised above body line; glides and soars on flat wings. **Adult** Grey-brown to brown head, chest and upperside, boldly banded grey and black tail; barred white and chestnut underbody, little banding showing on underside of tail unless spread. Wing-linings may be all chestnut, and flight-feathers silvery with black tips (northern populations); or wing-linings barred white and chestnut, and flight-feathers more or less barred, narrowly, with black (southern populations). **Juvenile** Brown above with obvious buff edgings, bold supercilia, browner banded tail; white below with clear dark spots, more buff wing-linings with smaller dark speckles, thinly barred remiges.

**CONFUSION SPECIES** Only other African raptors with combination of grey head and chest and barred abdomen are adult chanting-goshawks [104–106], Gabar Goshawk [107] and Lizard Buzzard [163] (all much bigger or smaller, with larger head, shorter wing-tips, narrow black instead of broad chestnut barring, orange-red cere and feet, different tail pattern and distinct flight action). On size and chestnut barring, remote possibility of confusion with males of some races of African Goshawk [111], more likely between the juveniles, but African Goshawk has quite different shape: no crest, short wings, long legs and, in flight, more rounded primary tips and different action.

**VOICE** Main call loud plaintive mewling *peer-oo*, somewhat *buteo*-like but more explosive, variations of which apparently uttered from perch or in flight as contact and display calls. Also, only when perched, treble whistle variously written as *choo-titti-too* and *piti-ti-oo*.

**FOOD** Large insects, reptiles, also nestlings, and occasionally small birds or mammals; crabs and fish also recorded. Insects principally grasshoppers, beetles, mantids, caterpillars, alate termites, occasionally some wasps. Reptiles especially chameleons, some other lizards, few small snakes. Mostly still-hunts, anywhere from low concealed to high open perch, moving fairly often with leisurely swooping flight from one tree to another; twists head about, looking in all directions, then usually drops on to prey on ground, but snatches

some chameleons from branches. Will also actively search in canopy, flopping about on half-spread wings and periodically peering around, or pursue insects on ground with clumsy hops. At times hawks aerial insects, or courses low over vegetation.

**SOCIOSEXUAL BEHAVIOUR** Usually singly, except in aerial displays; but during 'migrations' half-dozen may occur in small area. In breeding season males or pairs soar and circle, with undulating and tumbling displays, banking to show plain or barred chestnut wing-linings; sometimes four or five may then fly about together.

**BREEDING** Mainly October–February, in southern Africa September–March; but associated with onset of rains in tropics, so around June–August in West Africa and March–June and November–February in Kenya. Flimsy nest of leafy twigs 25–30 cm across and 15–25 cm deep, with shallow leaf-lined cup (few green leaves), 10–50 m up in concealed fork of tree canopy (looks like thin accumulation of debris). Clutch 2 (3). Incubation 52–55 days. Fledging 30–42 days.

**POPULATION** No data on densities, but generally considered uncommon, though often secretive, so easily overlooked and doubtless under-recorded. With range extending over 8 million km<sup>2</sup>, population seems likely to be at least in five figures. Forest and other extensively wooded areas obviously important, but adapts quite readily to secondary woodland, sometimes suburban gardens and, mainly in southern Africa, plantations (eucalyptus generally more likely to provide suitable nest sites than adequate food resources, though margins can be productive).

**GEOGRAPHICAL VARIATION** Only three races recognised here.

*A. c. cuculoides* (wooded savannah from Senegal through Nigeria and north Congo to southwest Ethiopia) Solid chestnut wing-linings, hardly barred flight-feathers.

*A. c. batesi* (lowland rainforest from Sierra Leone through Congo to Uganda and south to north Angola) Darker above and more heavily barred below.

*A. c. verreauxi* (woodland and both coastal and montane forest from Kenya, southern Congo and Angola south in east to South Africa) Larger, with white-banded wing-linings.

Forms superspecies with Madagascar Cuckoo-hawk [10] (sometimes even treated as conspecific) and, in our view, also with Jerdon's and Pacific Baza [11–12] of southeast Asia to Australia.

**MEASUREMENTS** *A. c. cuculoides* ♂ wing 289–295 mm, tail 182–187 mm, tarsus 30–35 mm. *A. c. batesi* ♂ wing 275–310 mm, tail 180–196 mm. *A. c. verreauxi* ♂ wing 293–328 mm, tail 190–208 mm. **Weights** 220–296 g.

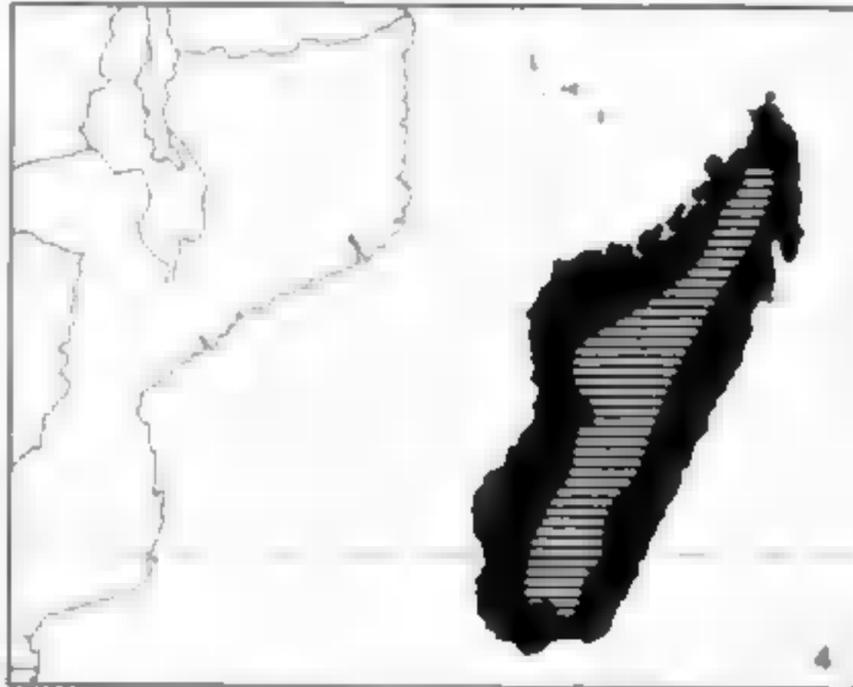
**REFERENCES** Ade (1985), Brown & Bursell (1968), Brown *et al.* (1982), Carlyon (1987), Chittenden (1984), Dewhurst *et al.* (1989), Finch-Davies & Kemp (1980), Ginn *et al.* (1989), Grimes (1987), Hall *et al.* (1991), Jeffery (1977), Jones (1985), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Maclean (1993), Pickford *et al.* (1989), Searle (1993), Snell (1963), Steyn (1982), Tarboton & Allen (1984), Thiollay (1978c), Vernon (1979), Weaving (1977), Zimmerman *et al.* (1996).

## 10 MADAGASCAR CUCKOO-HAWK *Aviceda madagascariensis* (A Smith, 1834)

Plate 8

Other names: Madagascar Cuckoo-falcon, Madagascar Baza

**DISTRIBUTION** Malagasy (12°S to 26°S); order 4; crepuscular and so probably under-recorded, but generally uncommon to scarce. Endemic to Madagascar, though now absent much of central plateau and parts of south.



**MOVEMENTS** Presumed basically sedentary, but juveniles probably more dispersive.

**HABITAT** Originally primary forest, both evergreen and dry deciduous, including marshy areas, but has adapted to degraded and secondary forest, wooded savannah, dense scrub and, less commonly, even coconut plantations; rarely also visits urban trees. Sea-level to 1,800 m.

**FIELD CHARACTERS** Medium-sized, plumpish-bodied, brown and white kite, larger than African Cuckoo-hawk [9] but still relatively small among kites as whole, with small flat head, slight crest (not usually visible in field), large bulging eyes, long wings, medium-length tail, short legs and weak feet. Frequently crepuscular: most often seen around dawn and dusk at forest edges and clearings. Perches chiefly within canopy, often at edge of clearing, but occasionally in open; wings well down tail. Sexes similar and female barely larger; juvenile separable; apparently moults direct to adult plumage (cf. African Cuckoo-hawk [9]).

**PERCHED Adult** Mainly brown above, but indistinct pale streaks on greyer head, white-mottled tail-coverts, white tip and three pale grey-brown bands on tail (basal two often edged and sometimes flecked with white); basically white below, including chest and tail-coverts, but brown streaks on throat and brown to slightly rufous blotches on flanks variably extending in band across breast. **Juvenile** Darker brown above, with more extensive white streaking on head and more white at base of tail; blotches below also darker and reaching up more to sides of chest. **Bare parts** Adult eyes brown or dull yellow, juvenile brown at first. Orbital ring greyish-brown, barely paler than head. Cere and feet whitish.

**FLIGHT** Mid-sized raptor with small, well projecting head, long wings compared with accipiters and most other forest raptors but less pointed than those of African Cuckoo-hawk [9], and longish tail; wingspan 2.2

times total length. Slow stiff or heavy-looking beats interspersed with glides on level wings held forward and slightly angled, secondaries clearly bulging; tail sometimes used as rudder during glide. **Adult** Brown above, with paler head, whitish rump, and banded brown and grey tail with some white including tip; below, white chest, belly and crissum, variably dark-mottled breast-band, flanks and wing-linings; greyish remiges and tail with dark bars and bands (more so than African counterpart). **Juvenile** Difficult to distinguish in flight, unless more extensive white streaking on head and whiter tail-base can be seen; darker blotches below extend to sides of chest.

**CONFUSION SPECIES** Easily confused with Madagascar Buzzard [205], which is larger, stockier and heavier-headed, with shorter rounded tail, broader rounded wings, brown or blotched chest, no dark breast-band, unevenly marked wing-linings. Henst's Goshawk [152] and much smaller other two endemic accipiters [117, 144] quickly excluded by shape (short wings reaching only tail-base, no crest, longer legs) and pattern (evenly barred or blotched below, or nearly plain, without contrast between white chest and blotched breast).

**VOICE** Apparently very silent. (May have weak mew and short whistle corresponding to calls of other cuckoo-hawks and bazas, but these not recorded.)

**FOOD** Mainly chameleons, green and other geckos, and large insects (including grasshoppers). Pair seen feeding insects to chicks. Still-hunts, not infrequently at dusk, waiting on concealed perch and then gliding, sometimes as far as 70–90 m, to snatch prey from foliage or tree trunk.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Stated never to soar, and some such observations may relate to misidentified Madagascar Buzzards [205], but there are past records of males shot in soaring display-flight, as might be expected from high-circling of other cuckoo-hawks and bazas [9–13]. One seen displaying in mid morning in September made several straight flights high above canopy, then tilted sideways and simultaneously fluttered its wings. One (probably the same) performed vertical stoops from high above the forest the same day.

**BREEDING** Very few data. Laying reported October–December. One nest was at 14 m in tree crown.

**POPULATION** Although distribution as mapped covers over 350,000 km<sup>2</sup>, wooded habitat now restricted to less than one-third of that area. The species is uncommon in surviving forested areas, and it has disappeared from much of deforested central plateau and parts of dry south. Population assumed to be in thousands, rather than five figures, though no data on densities. As under 10% of Madagascar's primary forest remains, species must be at long-term risk, though ability to adapt to secondary growth may help.

**GEOGRAPHICAL VARIATION** Monotypic. This and African Cuckoo-hawk [9] form a superspecies, which are here treated tentatively as also including Jerdon's and Pacific Bazas [11, 12].

**MEASUREMENTS** ♂♀ wing 315–331 mm, tail 197–230 mm, tarsus 35–42 mm. **Weights** No data.

**REFERENCES** Appert (1972), Benson *et al.* (1976), Dee (1986), Langrand (1990), Langrand & Mesborg (1984),

Malcolm (1970), Milou *et al.* (1973), Morris & Hawkins (1998), Rand (1936), Savan (1971).

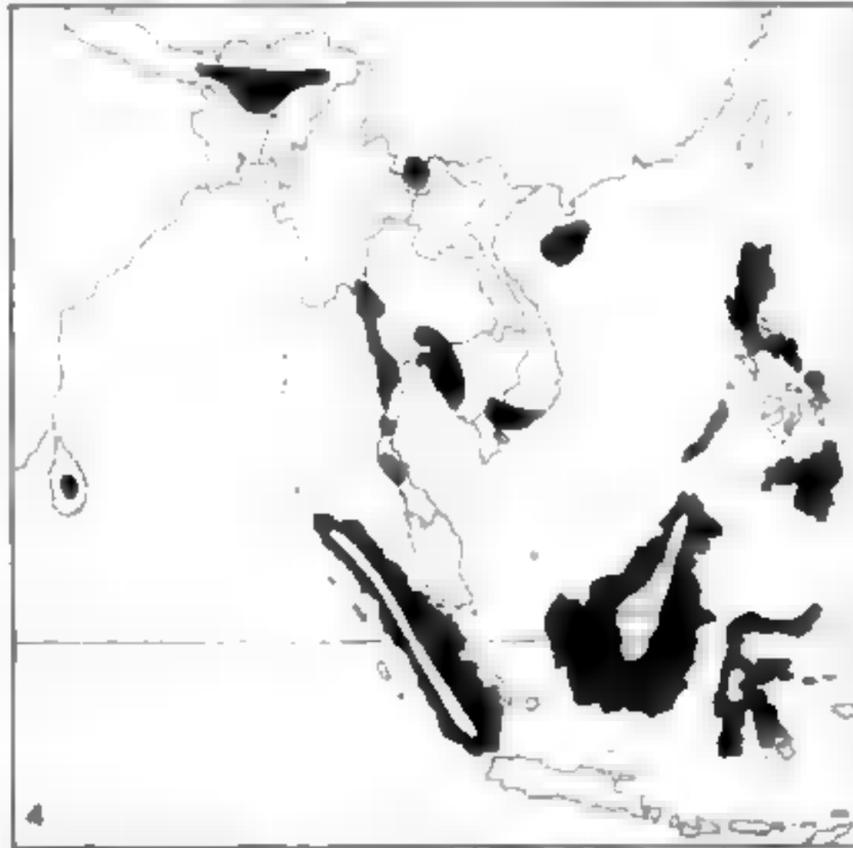
## 11 JERDON'S BAZA *Aviceda jerdoni* (Blyth, 1842)

Plate 9

Other names: Blyth's or Legge's Baza, Brown or Crested Lizard-hawk

**DISTRIBUTION** Indomalayan (28°N to 6°S); order 4; extensive but discontinuous range, and generally local and uncommon to rare. India and southeast Asia to Philippines and Indonesia: breeds south India (Western Ghats in west Mysore and Kerala, and probably Eastern Ghats in Andhra Pradesh) and Sri Lanka; northeast India (southern Sikkim and west Bengal through Assam); south China (southwest Yunnan, Hainan), extreme southeast Burma (Tenasserim), south Thailand (southeast and peninsular), perhaps extreme northwest peninsular Malaysia (where also wanders farther south), south Laos, southern Philippines (Samar, Luzon, Mindanao, Palawan), Borneo (Sabah, Sarawak, Kalimantan), Sulawesi (including Peleng, Banggai, Sula, Kabaena); perhaps also Vietnam (where recently reported in both Tonkin and Annam) and Sumatra (where occasional occurrence long established, but may be only vagrant via Malaysia). Now recorded for East Nepal.

**MOVEMENTS** Usually considered sedentary, but some seasonal altitudinal movements in highest parts of range in northeast India and occasional movement, perhaps mainly by juveniles, into northwest Thailand and peninsular Malaysia (where recorded only in northern winter). Unclear whether those in Sumatra and Vietnam more distant wanderers or resident breeders.



**HABITAT** Clearings and edges in evergreen forest, open deciduous forest, tea plantations, especially in foothills, but extending higher in eastern Himalayas; locally coastal swamp forest, and in Sulawesi hunts over mountain grassland. Mostly 150 m to 1,100 m, but locally to at least 1,850 m and down to sea-level.

**FIELD CHARACTERS** Medium-sized kite, as adult mainly brown above and more or less barred brown or rufous below, with fairly large double-toothed bill, smallish head, long crest held erect when perched, longish wings and tail, and short stout legs. Sluggish and somewhat crepuscular, but not especially shy. Perches unobtrusively inside foliage at wooded edge; wing-tips between half and two-thirds down tail. Sexes differ in colour saturation and strength of markings, female generally paler but averaging only about 3% larger; juvenile also distinguishable; as adult by second year.

**PERCHED All plumages** Long blackish crest with white tip. **Adult male** (mainland race; see Geographical Variation) Dark brown above, broadly edged rufous on nape and upper mantle, with grey-sided head, and dusky-banded and thinly white-tipped flight-feathers; grey-brown tail with whitish-buff tip and three dark brown bands (broad subterminal and two others, much narrower, towards base); black median stripe on rufous-edged white throat above dark-streaked buff to rufous chest, and blackish-edged rusty-brown to chestnut bars on whitish abdomen. **Adult female** Similar pattern, but paler in general, with tawnier head (no grey) and chest, yellower-rufous bars below, and more broken throat-stripe. **Juvenile** Paler still, because of buff edges on back and wings, looking scaly, and elsewhere whitish ground colour with black-streaked head to chest and sparsely rufous-blotched abdomen; tail coloured as adult, but three to four dark bands more evenly spaced. **Bare parts** Adult eyes golden-yellow to yellow-red, juvenile light brown. Cere bluish- to blackish-grey. Adult legs yellow, juvenile creamy-white to whitish-yellow.

**FLIGHT** Medium-sized kite with pigeon head (crest depressed in flight), longish tail, and rather long and distinctively shaped wings, slightly narrowed at bases and widest at wrists, with broad rounded hands; wingspan 2.0 times total length. Flies slowly with strong flexible beats and short glides on slightly raised wings; circles on level wings, often just above trees. **Adult** (mainland race) Largely brown above, apart from grey to rufous or tawny head, black line of flattened crest, and dark-banded flight-feathers and tail; below, white throat with variably conspicuous black median stripe, streaked chest and boldly barred abdomen and wing-linings (all with cinnamon-brown to rufous tone), greyish flight-feathers whiter at bases of primaries and evenly black-banded at tips; on whitish-tipped tail, browner above and greyer below, dark subterminal band much broader than the other two, which closer together on basal half. **Juvenile** Paler above, with buff edgings on back and wings; whiter head and underside, with clear but scattered black streaks on chest and only sparse rufous blotches on abdomen and linings; tail has four more evenly spaced bands (but basal one part-hidden).

**CONFUSION SPECIES** Because of crest and similarities

in pattern and general coloration, including grey cheeks, black median throat-stripe, and rufous streaks and bars below, as well as largely overlapping range. Crested Goshawk [109] most likely confusion, but usually smaller, with more protruding head, distinctly shorter crest, and much shorter narrower wings that barely exceed tail-base, as well as yellow cere, white lines on uppertail-coverts, more equal and evenly spaced tail-bands, white crissum, and various other differences in underpart markings. In Sulawesi, related Sulawesi Crested Goshawk [110] should be borne in mind, but is still smaller and shorter-crested, and distinctly streaked below. Otherwise, confusion possible with various southeastern Asiatic crested hawk eagles [237-243], of which the most similar in size, shape and pattern are Wallace's Hawk Eagle [243] and immature Blyth's [242], both of peninsular Thailand to Sumatra and Borneo, but they have relatively shorter and differently shaped wings, apart from other distinctions. See also Eastern Honey-buzzard [19].

**VOICE** Plaintive mewling, varying from disyllabic *pe-oh* to more drawn-out *pe-aw-roh*, with second note fading away; 'long drawn mournful queer' (in Ali & Ripley) may be variation. Acrobatic displays accompanied by loud sharp *tip-tip-tip...* or *kikiya-kikiya* (see Betts).

**FOOD** Mainly lizards and large insects (e.g. orthopterans, beetles); also frogs, small mammals and snakes. Still-hunts from concealed perch, pouncing down to snatch prey chiefly from ground, also from foliage; perhaps perch-hunts inside canopy. Although often active at dusk, uncertain how much prey is taken then.

**SOCIOSEXUAL BEHAVIOUR** Often in pairs, sometimes families of 3-5. Circling, single and mutual, regular early in breeding season and, if high up, may lead one bird (male?) into dive for 10-15 m on half-closed wings and then immediate upward swoop; repeated between intervals of soaring or continuously in full rollercoaster display.

**BREEDING** About April (or earlier)-August in northeast India, and February (or earlier)-June in southwest India and Sri Lanka (where copulation also recorded in September and November respectively). Small compact nest of twigs with shallow cup, lined with green leaves and sometimes grasses and roots, at 7-20+ m on stout branch or fork of large tree, usually in forest but sometimes more isolated in tea plantation. Clutch 2-3. Incubation and fledging periods unknown.

**POPULATION** Although known breeding range extends over some 1.6 million km<sup>2</sup> - one-third of which is Kalimantan (largest part of Borneo), where reported to be widespread if local - generally considered scattered and rare or, at best, uncommon. Because of unobtrusiveness, can be quite hard to find and doubtless under-recorded. Yet, despite adaptation to tea plantations, mostly dependent on wooded foothills and must be under increasing threat from forest clearance. Thus, probably unwise to expect population higher than four figures.

**GEOGRAPHICAL VARIATION** Five races, island races smaller and either paler or darker than mainland form.

*A. j. jerdoni* (northeast India and mainland south-east Asia) Largest race; brown above, male greyer on head and female more cinnamon, with rufous nape and chest, clearly brown-banded abdomen, broad tail-bands.

*A. j. ceylonensis* (south India, Sri Lanka) Smaller, paler upperparts and chest, less banded abdomen, narrower tail-bands.

*A. j. magnirostris* (south Philippines) Slightly smaller than *jerdoni*, but bill stouter; darker, with stronger rufous barring below, blacker crest, grey sides of head and throat.

*A. j. borneensis* (Borneo) Again smaller; darker above, more heavily banded rufous below, rufous sides of head and neck.

*A. j. celebensis* (Sulawesi) Smallest race; darkest above, most richly rufous-banded below, head also strongly black-streaked rufous.

Forms superspecies with other brown hawks [9-11]; see African Cuckoo-hawk [9].

**MEASUREMENTS** *A. j. jerdoni* ♂ wing 323-360 mm, tail 210-244 mm, tarsus 35-40 mm. *A. j. ceylonensis* ♂ wing 297-312 mm, tail 190-211 mm. *A. j. magnirostris* ♂ wing 292-311 mm, ♀ 298-324 mm. *A. j. borneensis* ♂ wing 291-308 mm. *A. j. celebensis* ♂ wing 280-305 mm.

**Weights** *A. j. magnirostris* ♂ 353 g (one).

**REFERENCES** Ali & Ripley (1978), Betts (1953), Bishop *et al.* (1994), Cheng Tsohsin (1987), Dickinson *et al.* (1991), Goodman & González (1990), Henry (1998), Holmes & Burton (1987), King *et al.* (1975), Lekagul & Round (1991), Mackinnon & Phillipps (1993), Medway & Wells (1976), Meyer de Schauensee (1984), Rand & Rabor (1960), Riley (1938), Ripley (1982), Smythies (1981), Stresemann (1940), van Balen (1994), van Marle & Voous (1988).

## 12 PACIFIC BAZA

*Aviceda subcristata* (Gould, 1838)

Plate 9

Other names: Crested Baza, Crested Hawk, Lizard Hawk

**DISTRIBUTION** Australasian (2°N to 36°S) extending westwards, marginally, into insular Indomalayan; order 5; often scarce, but locally common, particularly on some small Papuan islands. Australia, Indonesia, New Guinea and Solomon Islands: north and east Australia (Kimberleys to Arnhem Land, Cape York to east of Canberra) and much of New Guinea, thence extending west to Moluccas, Tukangbesi, Tanahjampea, Bonerate, and Lesser Sundas as far as Lombok, and east through

Admiralty Islands, New Britain and New Ireland to Solomon Islands.

**MOVEMENTS** Probably largely sedentary, but some local altitudinal movements in southeasternmost Australia and perhaps makes local seasonal movements in north Australia, while tends to move to drier ground away from water outside breeding season in New Guinea.

**HABITAT** Rainforest, wet sclerophyll forest, galleries and swamp forest, mostly at edge, also secondary growth, open woodland, savannah, mangroves, tree-lined water-

courses and, locally, suburban gardens and orchards, though last two habitats usually more typical of non-breeders. Almost everywhere less than 300 km inland and, on all except largest islands, often commonest along or near coast. Sea-level to 1,000 m, less commonly to 1,300 m, but in New Guinea more rarely up to 1,700 m in disturbed habitats; mainly lowlands in Solomons.



**FIELD CHARACTERS** Smallish to medium-sized kite, mostly slate-grey to blackish or brown above and barred on belly, with small head, obvious erectile crest, surprised look (due to lack of ridged brows over prominent golden-yellow eyes), short bare legs, stubby toes, and barred 'cuckoo pattern'. Perches upright within canopy, but unobtrusive rather than secretive and often quite tame; in New Guinea often perches conspicuously in trees with little or no foliage; tips of long wings almost reach end of longish tail. Colours variable over wide range (see Geographical Variation). Sexes rather similar, female tending to be browner above, with whiter throat and, in some cases, more rufous-tinged abdomen or browner barring below, and averaging only 3% larger and 2-16% heavier; juvenile separable (but not clear whether moults direct into adult plumage or passes through separate immature stage).

**PERCHED Adult** Grey head and chest, and darker or browner crest, back and wing-coverts; grey tail with broad black tip and two to three variably prominent basal bars; and pale abdomen with bold red-brown, brown or blackish barring, except for pale rufous thighs and undertail-coverts. **Juvenile** Also racially variable, but echoes adult pattern and has similar crest: brown to dark brown upperparts clearly scaled with pale rufous-buff edges; pale supercilia, whitish throat, grey-rufous collar; otherwise, cream to rufous-washed below with some streaking or faint barring on chest, clearer bars on abdomen, and plain crissum. **Bare parts** Adult eyes lemon-yellow to golden-yellow, juvenile pale yellow, becoming brighter. Adult cere blue-grey to slate, juvenile cream to blue-horn. Adult feet blue-white to pale grey, juvenile cream to pale yellow.

**FLIGHT** Medium-sized dark raptor with small head,

recalling cuckoo, pigeon, or honey-buzzard; long, broad rounded wings, noticeably broad near fingered tips and narrower at bases, often angled forward at carpal joints and with markedly curved secondaries; longish tail rather square-tipped, but seeming more rounded from below because of pale corners; wingspan 2.3 times total length. Slow-looking flight with loose shallow beats, but at times more fluid with deeper rowing action; glides and soars on flat or slightly bowed wings, mainly just above trees except in aerial display. **Adult** All slate to brownish-grey above, with prominent black tip to tail and two to three faint basal bars; from below, barred abdomen and axillaries contrast with grey head, rufous wing-linings and crissum, silvery flight-feathers with clear bars on primaries behind dark tips and broad dark trailing edges to secondaries, and grey tail with thin basal bars, broad black end and variably pale corners. **Juvenile** Much browner above and washed rufous below, with more obscurely rufous-barréd underbody and wing-linings.

**CONFUSION SPECIES** Almost unmistakable, even when perched. No overlap in range with only other crested hawks of comparable size (Jerdon's Baza [11] and Crested Goshawk [109]). Grey head, grey or brown back and rufous-barréd underparts might conceivably cause confusion with some accipiters, such as Brown Goshawk [119] and Collared Sparrowhawk [139] over much of the range, Varied Goshawk [121] in New Guinea and adjacent islands and, more locally, Moluccan Goshawk [127], but these all have quite different jizz with short wings reaching only tail-base at rest, long legs and, in flight, different shape, wing action and pattern. Long-tailed Honey-buzzard [16] has streaked head and breast with no barring, and differently banded quills. Habitat, size, small crested head, grey upperparts, black-tipped tail and pigeon-like display-flight (see Sociosexual Behaviour) have suggested chance of confusion with Topknot Pigeon *Lopholaimus antarcticus*, but form of bill and crest, proportions and, in flight, shape and wing action essentially different.

**VOICE** Often noisy in breeding season. Main call repeated high-pitched disyllabic whistle, *re-chu, re-chu* or *tlee-tlu*, high and reedy with second syllable lower, descending and more explosive. Other calls include high *hie-tie-tie-tie* and rather subdued *heo-heo-heo*. Also weak high piping when perched.

**FOOD** Chiefly larger insects (e.g. stick insects, mantids, caterpillars, beetles, grasshoppers), tree frogs and small lizards, proportions apparently varying considerably in different parts of wide range; sometimes figs or other tree fruits commonly taken (perhaps especially in New Guinea); rarely small birds, nestlings and mammals, and once a snake carried half-swallowed to nest. Thus almost omnivorous, but mainly small items. Nearly all prey taken from foliage of trees, but sometimes lizards from cliffs and grasshoppers from ground. Mainly still-hunts from series of concealed or open perches, swooping out to snatch arboreal vertebrates; also forages with slow beats just over tree tops and hovers flappingly at foliage, or actively clambers about in or over canopy, periodically hanging with beating wings or stretching up or down to reach slow-moving insects. Pairs or small groups often hunt co-operatively.

**SOCIOSEXUAL BEHAVIOUR** Often singly, or in pairs or family parties, but sometimes in groups: up to 17 adults and juveniles recorded together, and even up to 30 adults. In breeding season, much single and mutual high-circling, as well as variety of more active displays, some of which exhibit the chestnut wing-linings and barred flanks. Male's undulating sky-dance is distinctively pigeon-like, climbing with few deep laboured beats and, after brief stall at apex, descending with wings in such strong dihedral as to seem almost vertical; usually legs are trailed or thrust forward towards end of each climb, and rarely bird may somersault at apex, but sometimes undulations very shallow and remaining features less marked; repeated many times, usually but not always with much calling. Sometimes two or three may be seen displaying at same time. Other displays include side-slipping and rolling over in level flight; dropping into canopy on closed wings, or through tree tops and then swooping up into cover; pursuit-flights through canopy; and diving at mate on high exposed branch.

**BREEDING** September/October–February in Australia, but evidently July–January in New Guinea and Solomons. Flimsy pigeon-like nest of twigs when new, only 30–40 cm across and perhaps just 12–15 cm deep, but becoming quite substantial after re-use, lined with green leaves; near end of lateral branch or in thin vertical fork at 6–35 m in eucalyptus, angophora or other (usually tall) tree, even coconut. Clutch 2–3 (2–5). Incubation 29–33 days. Fledging 32–35 days.

**POPULATION** No data on densities apart from subjective assessments that more numerous in one area than another: for example, 'Common all along the coast [of New Ireland]... More numerous than anywhere that we have encountered the species on the mainland [of Papua New Guinea]' (Finch & McKean). In such cases, comparative road counts against distance would be useful. Said to be rare in Sumbawa and Flores but common (locally frequent) in Solomons and Tanahjampea. In Australia it was found in 11% of atlas blocks. With distribution limits enclosing total area over 2.5 million km<sup>2</sup>, it seems safe to assume a population of at least tens of thousands. Deforestation must be a problem in some areas, but not yet widespread serious threat as much suitable habitat remains; seems to be tolerant of selective logging, as often found in disturbed habitats with some trees (e.g. Solomons).

**GEOGRAPHICAL VARIATION** Some 16 races described, many from small archipelagos, though not all generally accepted: they vary in size, degree of sexual dimorphism, colour of crown and upperparts, breadth of terminal tail-band, and colour and strength of abdominal barring. Insular races at west and east of range tend to be smallest, but pale and dark forms show more chequerboard variation. All are listed here, roughly divided into four broad colour groups.

#### Brown group

*A. s. subcristata* (east Australia) Largest race; brownish back, brown to red-brown bands on abdomen.

*A. s. megala* (eastern New Guinea, D'Entrecasteaux) See *A. s. waiguensis*.

*A. s. stenozona* (west New Guinea, Aru, Misoöl, Salawati) See *A. s. waiguensis*.

*A. s. waiguensis* (Waigeo) Similar to *subcristata* but smaller, sex for sex, and varying in brownness above and strength of barring and rufous below.

*A. s. stresemanni* (Buru) Again like *subcristata*, but smaller, with blacker barring below, bright rufous crissum.

#### Black group

*A. s. njikena* (northwest Australia) Averaging smaller than *subcristata*, larger than rest of brown group, blacker above, blackish barring below.

*A. s. obscura* (Biak) See *A. s. reinwardtii*.

*A. s. reinwardtii* (south Moluccas) Much darker than other Indonesians (*bismarckii*, *coultasi* and *rufa*) more like *njikena*.

*A. s. bismarckii* (New Britain, New Ireland, New Hanover) See *A. s. coultasi*.

*A. s. coultasi* (Admiralty Islands) Medium-sized; much darker than other Papuan/Solomons races *megala*, *gurneyi*, *robusta* and *proxima* again more like *njikena*, slate above and more or less heavily barred blackish below.

#### Rufous group

*A. s. rufa* (north Moluccas) Medium-sized; reddest race, with rufous wash on head, bold rufous barring below.

#### Pale group

*A. s. pallida* (Kai) See *A. s. timorlaeensis*.

*A. s. timorlaeensis* (Lewer Sundas) Small to medium-sized with greater RSD; very pale to pale above, variably washed rufous below.

*A. s. gurneyi* (southeast Solomons) See *A. s. proxima*.

*A. s. robusta* (central Solomons) See *A. s. proxima*.

*A. s. proxima* (northwest Solomons) Small to medium-sized, with least sexual size dimorphism (except in tail length); much paler than adjacent Bismarck races *bismarckii* and *coultasi*, pale brown above, barring reduced or almost absent below.

Forms superspecies with other brown bazas [9–11]; see African Cuckoo-Hawk [9].

**MEASUREMENTS** *A. s. subcristata* ♂ wing 305–349 mm, ♀ 320–362 mm; ♂♀ tail 180–230 mm, tarsus 31–42 mm. Other races ♂♀ wings combined: *A. s. megala* 310–348 mm, *A. s. stenozona* 290–314 mm, *A. s. waiguensis* 308–319 mm, *A. s. stresemanni* 302–325 mm, *A. s. njikena* 310–348 mm, *A. s. obscura* 278–300 mm, *A. s. reinwardtii* 285–307 mm, *A. s. bismarckii* 299–329 mm, *A. s. coultasi* 304–317 mm, *A. s. rufa* 310–317 mm, *A. s. pallida* 285–319 mm, *A. s. timorlaeensis* 295–325 mm, *A. s. gurneyi* 288–318 mm, *A. s. robusta* 300–324 mm, *A. s. proxima* 270–300 mm. **Weights** *A. s. subcristata* ♂ 259–357 g, ♀ 290–448 g, *A. s. bismarckii* ♂ 275–310 g, ♀ 320–411 g, *A. s. robusta* ♂ 300–325 g, ♀ 306–411 g, *A. s. proxima* ♂ 255–295 g, ♀ 260–300 g.

**REFERENCES** Baker-Gabb (1984a), Beechler *et al.* (1986), Bell (1984), Beruldsen (1980), Blakers *et al.* (1984), Buckingham *et al.* (1995), Coates (1985), Copper & Copper (1981), Czechura (1993), Finch & McKean (1987), Hadden (1981), Hollands (1984), Hoogerwerf (1971), Ley (1990), Lord (1934), Marchant & Higgins (1993), Meyburg & van Balen (1994), Milledge (1979), Olsen (1993), Olsen & Marples (1993), Olsen *et al.* (1993), Schodde (1977), Schodde & Tidemann (1988), van Balen (1994), Webb (1997), White & Bruce (1986).

## 13 BLACK BAZA

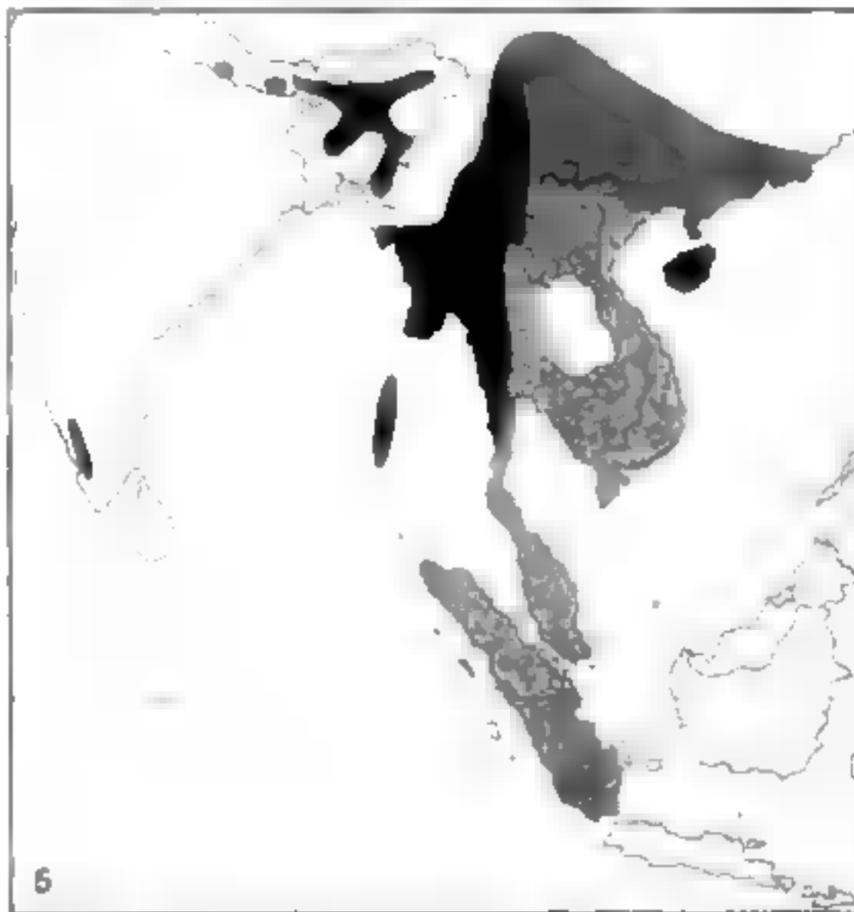
*Aviceda leuphotes* (Dumont, 1820)

Plate 9

Other names: Black-crested Baza/Lizard-hawk

**DISTRIBUTION** Indomalayan and, very marginally, southeastern Palearctic (31°N to 8°N, wintering to 7°S); order 5; locally common, but mostly uncommon to scarce or rare except on passage and at winter roosts. India and southeast Asia, wintering to Greater Sunda; breeds southwest India (Kerala) and, separately, in lower east Himalayan region from eastern Nepal, Bhutan and north Bangladesh through northeast India (Sikkim and north Bengal across north and east Assam) to Burma and west Thailand, thence into south China (Yunnan to Guangdong and north to Guizhou and Sichuan up to 200 km beyond Chiang Jiang river) and perhaps north Laos and north or even central Vietnam; also south Hainan and at least South Andaman Island; may breed elsewhere in Indochina, where currently known only as migrant in northern winter.

**MOVEMENTS** Probably resident, or only partially migratory, in southwest India, Bangladesh, parts of Assam, Burma, Thailand, and Andaman, but largely or entirely summer visitor in eastern Himalayan region and China. Occurs as passage migrant and winter visitor, sometimes commonly, in much of mainland southeast Asia, moving through peninsular Malaysia to Sumatra (and, rarely, west Java) in October–December and back in February–March. Straggles to Sri Lanka, supposedly from eastern Himalayan region, though most from there probably make only altitudinal movements and species rarely recorded in eastern peninsular India.



**HABITAT** More open areas and edges in both deciduous and drier evergreen forest, including bamboo, also secondary woodland, especially in broken plains and foothills and often in vicinity of glades and streams or rivers, but on passage and in winter sometimes also in orchards and gardens around villages or hunting over ricefields, sugarcane and other cultivation. Sea-level to at least 1,500 m, breeding mainly between 100 m and 1,200 m.

**FIELD CHARACTERS** Smallish chunky kite, mainly black, white and shades of rufous, with double-toothed bill, rather small head, long crest often held vertical or raised and lowered when perched, longish wings, medium-length tail, and short legs. Somewhat crepuscular and variably shy or tame. Perches rather upright, often unobtrusively in leafy tree but also on exposed branch; sometimes stretches, or hangs, downwards; wing-tips cover three-quarters of tail. Sexes generally similar (though female may show less white on secondaries, and in Andaman race barring apparently different below; see Geographical Variation) and little or no RSD; juvenile also very similar, but distinguishable; as adult by second year.

**PERCHED All plumages** Mainly black, including head and long crest, with white and chestnut markings above and below. **Adult** Dark areas glossy black; white feather-centres and variable chestnut markings on lower back, scapulars and greater wing-coverts, and largely chestnut, or chestnut and white, patch on secondaries; below, black throat, white chest-band separated by thin black strip and variable chestnut band from buff to pale rufous-buff abdomen more or less barred with black-edged darker rufous, contrasting black crissum and thighs. **Juvenile** Broadly similar, but slightly shorter crest and all blackish areas duller and browner; more white centres on back and wing-coverts, little or no white and more chestnut on secondaries; streaked white on blackish throat and brown on white chest-band, with narrower black breast-band. **Bare parts** Eyes purplish-brown to reddish-brown. Cere dark blue-grey. Legs dull grey-black to blue-black.

**FLIGHT** Smallish, accipiter-sized but rather crow-like kite with pigeon head (crest usually depressed in flight), medium-length tail, and long wings proportionately narrower than those of Jerdon's Baza (11), but still widest at wrists and with broad rounded hands; wingspan 2.2 times total length. Flies fairly slowly, but busily, with flexible crow-like flaps and short glides on flat or almost flat wings; soars on level wings, high up on migration. **Adult** Predominantly black above, including head to mantle, forewings and tail, but contrasting blotches of white and variable chestnut show up on lower back, scapulars and inner greater coverts, while spread secondaries form large chestnut and variably white specula edged with black (at distance, only the white shows up, while the chestnut simply looks dark); pattern below even more distinctive, with black head, wing-linings, wing-tips, central belly, crissum and thighs that contrast with successive broad white, narrow black and variable chestnut pectoral bands, more or less rufous-buffed abdomen, and mainly grey quills, darkest on secondaries and towards end of tail and more silvery on primaries and tail-base. **Juvenile** Sufficiently similar to rather variable adult for distinction in flight to be difficult unless accompanying adults present, thus highlighting duller browner-blacks, or unless bird close enough to show thin contrasting streaks on black throat and white chest.

**CONFUSION SPECIES** Made unmistakable by crest and mainly black plumage with distinctive white markings and rufous barring. See larger Jerdon's Baza (11).

Eastern Honey-buzzard [19], Bat-hawk [22]. Consider black corvids that show some white: Crested Jay *Platylophus galericulatus*, Black Magpie *Platysmurus leucopterus*.

**VOICE** Often vocal, perched or in flight. Single, double or treble note variously described as soft, quavering plaintive squeal or whistle, recalling Black Kite [39]; shrill gull-like mewling; or weak scream similar to ringing *k-leep* of Large Cuckoo-shrike *Corucina novae-hollandiae*. Also harsh squawk.

**FOOD** Large insects (e.g. beetles, grasshoppers, mantids, moths), lizards and tree frogs; occasionally bats, small ground mammals and small birds. Still-hunts from concealed or open perch, dropping down to ground or sailing out to snatch prey in flight or, with momentary flutter or hover, from foliage; also perch-hunts with short flights through canopy, even dashing into dense foliage; will fly to and fro through insect swarms or roosting passerine flocks. May forage socially. Often most active at dusk and, otherwise, when sky overcast.

**SOCIOSEXUAL BEHAVIOUR** Social to gregarious; often in pairs, or family or other small crow-like groups of up to five; migrating flocks and close-packed communal winter roosts of up to 20–25. Soars high, especially when flushed from perch or on migration. No aerial displays described.

**BREEDING** February–July, mainly from March in southwest India and Burma, and April onwards in northeast India. Small compact nest of twigs, 25–40 cm across and 10–20 cm deep, with shallow cup lined with grass, fibres and green leaves, usually at 20+ m in tall forest tree, often close to stream or pool. Clutch 2–3. Incubation and fledging periods unknown.

**POPULATION** Breeding range includes nearly 1.5 million km<sup>2</sup>, 60% of which is deserted in late autumn and winter, when this species becomes relatively widespread as migrant over more than 2.3 million km<sup>2</sup>. No data on densities, but generally regarded as scarce to uncommon, even rare, in breeding range and yet common as passage migrant or winter visitor in southeast Asia. Given that migrant flocks move about and are more conspicuous than nesting pairs, it is likely that this bird's summer unobtrusiveness makes it appear more uncommon than it really is. Five-figure population seems

a reasonable expectation: a breeding density of only 1 pair/300 km<sup>2</sup> would be required to reach bottom of that bracket, while six figures would be most unlikely for a species dependent on wooded foothills in a region where so much forest has already been lost. Continuing tree clearance must be ongoing threat.

**GEOGRAPHICAL VARIATION** Apparent individual variation, especially in amount of white on secondaries, may be due partly to inadequately understood sex differences. Racial variation complicated by insufficient museum material from some regions (see Deignan). Five races have been named, but *wolfei* is based on just one specimen from Sichuan, China, and the more clearly distinct *andamanica* (see below) on only two, while *burmana* (south Burma, west Thailand), supposedly with less chestnut above and almost none in the black breast-band below the white chest, has variously been combined both with nominate *leuphotes* and with *nyama*, but seems closer to latter. All distinctions rather variable and only three races recognised here.

*A. l. leuphotes* (southwest India, possibly also south Burma and west Thailand) Tendency to more chestnut and white on upperparts; broad and largely chestnut breast-band edged with black at top; less barring on more rufous-buff abdomen below.

*A. l. nyama* (Nepal to north Burma and south China, probably also south Burma and west Thailand) Tendency to blacker upperparts with less white and chestnut; narrower and mainly black breast-band; stronger rufous barring on buff abdomen.

*A. l. andamanica* (Great Andaman Island) Both specimens small; most of abdomen unbarred and shading more to rufous on lower breast, but one (male) or two (female) thin chestnut bars below narrow blackish and chestnut breast-band.

**MEASUREMENTS** (all races combined) ♂ wing 221–246 mm, tail 127–149 mm (only *A. l. andamanica* below 130 mm), tarsus 25–30 mm. **Weights** ♂♀ 168–224 g.

**REFERENCES** Ali & Ripley (1978), Abdulah & Grubb (1970), Cheng Tso-hsun (1987), Deignan (1945, 1948), Etchécopar & Hùc (1978), Henry (1998), Inskipp & Inskipp (1985), King BF *et al.* (1975), Lekagul & Round (1991), Mackinnon & Phillipps (1993), Medway & Wells (1976), Meyer de Schauensee (1984), Riley (1958), Smythies (1986), Tikader (1988), van Marle & Voous (1988).

## 14 GREY-HEADED KITE

*Leptodon cayanensis* (Latham, 1790)

Plate 13

Other name: Cayenne Kite

**DISTRIBUTION** Neotropical (23°N to 32°S); order 5; widespread but generally uncommon and local except in Amazonia. Central and mainly tropical South America: tropical eastern Mexico (south Tamaulipas and Oaxaca through Chiapas and Yucatán), but not apparently now Belize (?), patchily south through Central and South America to west Ecuador (now very rare) on the Pacific side and, east of the Andes, from Colombia, Venezuela and Guianas through Amazonian Brazil (rarer in other parts), eastern Ecuador and Peru, to northeast Bolivia (Pando to east Cochabamba and Santa Cruz), Paraguay, northeast Argentina (rare east Formosa, Chaco, Corrientes,

uncommon Misiones) and southeast Brazil (uncommon Paraná, once Rio Grande do Sul); also Trinidad.

**MOVEMENTS** Apparently rather sedentary, apart from any juvenile dispersal.

**HABITAT** Tall forest canopy and edge, also partly open areas adjacent. Commonest along rivers in lowland forest, and in other wet primary forest or forest edge near water, more locally in dense gallery forest, in savannah woodland near marshes and in humid (not usually dry) premontane foothills. Adapts uneasily to semi-cleared areas, perhaps more readily to secondary growth. May sometimes soar over more open country. Sea-level to 2,200 m, but commonest below 1,000 m.



**FIELD CHARACTERS** Medium-sized to largish kite with slender bill, bare lores, small head, blunt wings, longish rounded tail, and short stout legs. Perches in trees, usually well hidden in canopy unless calling (see Voice); when hunting, particularly in early mornings and evenings, may use more open and lower branches, but still generally unobtrusive and sluggish, moving slowly and deliberately inside thicker foliage; wing-tips do not extend far beyond tail-coverts. Sexes similar; though some hardly bigger than smallest males, female averages 4% larger, and may be up to 26% bigger and 46% heavier; juvenile regarded as dimorphic (or, with intermediates, almost polymorphic) and quite distinct; like monomorphic adults when first moult fully completed.

**PERCHED Adult** Mainly slaty-black above and white below, usually with slight pearly tinge, but grey crown and nape, paler grey cheeks, obscure thin two-tone grey bars on wings, and blacker tail with thin white tip and two narrow whitish bars (as well as third, largely concealed, on tail-coverts); tibial feathers may be mottled with slaty-black; usually no yellow on bare parts except, sometimes, legs (see 'Subadult?' below). **Pale juvenile** Head and underbody white but for dusky crown-patch and triangle behind eyes; otherwise brown above, edged rufous on back and wings, with grey-buff tip and two broad pale grey-brown bands on tail; bare parts mainly yellow. **Dark juvenile** Very variable on underbody, but all dark brown to blackish-brown above, typically including head and usually with thinner rufous fringes on back and wings; in southern range, head may also be tinged rufous, sometimes with obscure rufous collar; white to cream underbody varies in markings from heavily and evenly streaked with blackish-brown to having almost solidly dusky throat and chest or, at other end of scale (which might be regarded as intermediate morph), no more than dusky shaft-streaks and single broader median throat-stripe; tail and bare parts as pale juvenile. **Subadult?** Apparent adults with more or less yellow legs may perhaps be second-years. **Bare parts** Adult eyes brown to grey, or even dark blue-grey to almost blue-black, juvenile yellowish-olive to red-brown. Adult cere, bare facial skin and legs blue-grey to grey-blue, juvenile yellow to orange-yellow or reddish.

**FLIGHT** Medium-sized raptor looking oddly proportioned with smallish head, broad and bluntly round-tipped wings with bulging trailing edges, and long accipiter-like tail; wingspan 2.1 times total length. Active flight a mixture of slow flexible beats and short glides, though can be surprisingly agile when chasing flying insects; glides and soars, though not usually very high, on flat or slightly bowed wings. **Adult** From above, mainly slaty with blacker tail and hands, both thinly pale-banded, and also blacker mantle behind paler grey head; strikingly contrasted from below, with white body, black wing-linings, boldly banded flight-feathers and tail. **Pale juvenile** Dark brown above, apart from neatly dusky-capped white head and broad greyish tail-bands; all creamy-white below, including wing-linings and bases of secondaries, but for thin dark bars on more buff flight-feathers (especially primaries) and two bars of variable width on greyer tail. **Dark juvenile** All dark above but for greyish-banded tail, any pale collar very obscure; very variable below, from dark head and heavily streaked body to mainly creamy-buff with median throat-stripe and thinly streaked body; compared with pale morph, wing-linings more buff and mottled, secondaries browner, and dark tail-bands often broader. **Subadult?** Said to resemble adult, but for white wing-linings and yellowish legs.

**CONFUSION SPECIES** Adult virtually unmistakable, whether perched or in flight (though see *Leucopternis* [165-174] and, in easternmost Brazil, bear in mind Forbes's Kite [14a]). By contrast, pale juvenile, with white head and underparts and dark cap, broadly similar to adult Black-and-white Hawk Eagle [234] (generally but not exclusively larger, bulkier, blacker above, with orange cere and black lores, short crest, longer and feathered legs and, in flight, thinner and less clear banding on primaries and tail). See also Collared Forest-falcon [265] (comparable size but shorter-winged with graduated tail, blacker above with whole crown black and dark cheek-crescent, more secretive, in flight all quills boldly barred below); pale juvenile Hook-billed Kite [15] (generally smaller and proportionately shorter-tailed, with heavy bill, all-dark crown and upper nape, some thin dark barring below); and even, because of their dark hindcrown and general pattern, immature Ornate Hawk Eagle [245] and pale adult Crested Eagle [213] (both larger and bulkier and quite differently shaped). Dark juvenile Grey-headed Kite, particularly because of its variability on head and underbody, produces plumages that recall juveniles of Double-toothed Kite [31], Mangrove Black and Lesser Black Hawks [176, 177], and Grey-lined and Roadside Hawks [185, 186], but these all have different shapes.

**VOICE** Probably silent except when breeding. Then commonest call loud, far-carrying, trogon-like bark *wuh wuh...*, or more clucking *kek kek kek...*, or guttural *kyo kyo kyo...* often in series of 15-20 (sound can be confused with that of Laughing-falcon [260]). Other individuals (both sexes?) may answer from adjacent territories. Also recorded: cat-like miaow; high ringing whistles reminiscent of hawk eagles *Spizaetus* [244, 245]; screaming *aaammewhen* disturbed at nest; and, in soaring flight, gull-like *aaaahh-yal*, first part rising and second dropping.

**FOOD** Wide variety of insects, especially larvae and combs of hornets, wasps and bees; also eggs, young or injured birds, frogs, molluscs, arboreal geckos and other lizards, and snakes. Typically still-hunts (especially at

dawn and dusk) from one of series of more or less exposed tree perches, dropping on to prey on ground or chasing flying insects to capture in feet; also clambers about inside canopy, presumably searching for food. During mass emergences of large-bodied cicadas in wet season, pairs may spend several hours a day closely accompanying troupes of marmosets *Callithrix* to capture the cicadas they disturb.

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in pairs. Barking calls (see Voice) usually uttered from high dead branches or other vantage points overlooking forest, sometimes in flight. Apart from regular mutual soaring, including mixture of flapping and gliding, 'display flights' have been referred to but not described. One juvenile hung upside-down from branch 3 m above ground with wings half extended for 15 minutes before flapping slightly and righting itself without difficulty; it was considered not to be feeding, anting, sunning or displaying.

**BREEDING** Little known. Begins to call towards end of dry season. Three birds shot in breeding condition in Colombia all January-March; nests March-July in Costa Rica. Thin platform of sticks and twigs in main or horizontal fork high in forest canopy. Clutch 2-3. Incubation and fledging periods not recorded.

**POPULATION** Another forest species whose distribution encloses over 12 million km<sup>2</sup>, but whose range is becoming increasingly fragmented in many areas owing to deforestation for agriculture, ranching and mining. Average density of at least 3 birds/10,000 ha estimated at one forest site in French Guiana, but no other data on densities, and a suggested five-figure order of population (tens of thousands) is no more than a guess: in so large an area, it may be an underestimate.

**GEOGRAPHICAL VARIATION** Generally treated as monotypic, but specimens from Bolivia, Paraguay, south Brazil and Argentina average larger and have been separated as *L. c. monachus*. Juveniles dimorphic (even polymorphic), but adults not. (See also Forbes's Kite [14a].)

**MEASUREMENTS** ♂ wing 290-355 mm, ♀ 303-365 mm; ♂ tail 199-250 mm, ♀ 218-263 mm; ♂ tarsus 43-51 mm, ♀ 46-54 mm. **Weights** ♂ 415-455 g, ♀ 416-605 g.

**REFERENCES** Albuquerque (1986), Belton (1984), Blake (1977), Dickey & van Rossem (1958), Ferrari (1990), Foster (1963, 1971), Haverschmidt (1962, 1968), Herklots (1961), Hilty & Brown (1986), Howell & Webb (1995), Meyer de Schauensee & Phelps (1978), Monroe (1968), Navas & Bó (1991), Olrog (1985), Salaman (1993), Sick (1993), Slud (1964), Stiles & Skutch (1989), Thiollay (1985c, 1989a/b, 1991a), Voous (1969), Wetmore (1965).

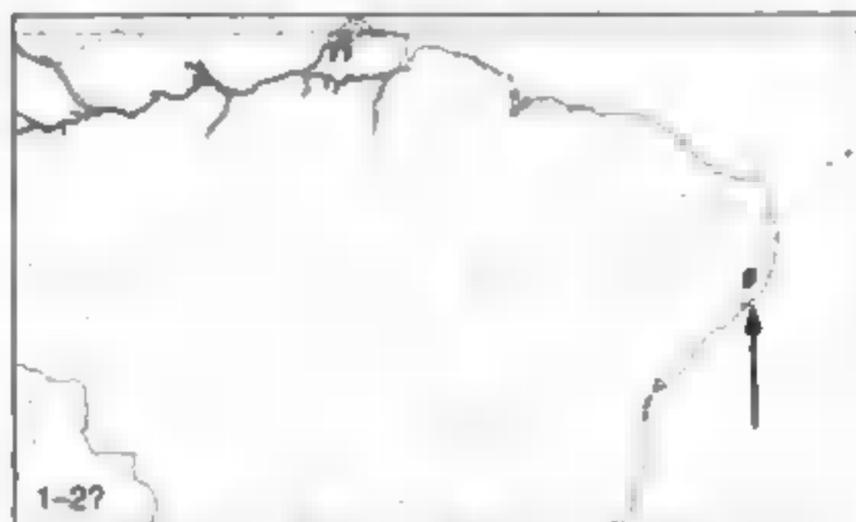
## 14A FORBES'S KITE

*Leptodon forbesi* (Swann, 1922)

No colour plate

Other name: White-collared Kite

**DISTRIBUTION** Neotropical (8-10°S); order 1-2; believed to be local, very rare and seriously endangered. Northeast Brazil: Alagoas and Pernambuco.



**HABITAT** Coastal rainforest, which in the Brazilian states concerned is one of the most important areas for threatened birds in the Neotropics, yet which is being devastated through slash-and-burn clearance by a poor rural population for the conversion of land to sugarcane. 'I have visited the remaining forest tracts in these states (the largest in Alagoas is just 30 km<sup>2</sup>, in Pernambuco 45 km<sup>2</sup>) and there have been no recent observations of *forbesi* to my knowledge' (M Pearman *in litt* 1998). Sea-level to 600 m.

**HISTORY AND CHARACTERS** This taxon was long known only by the type specimen from Pernambuco, which is in the Natural History Museum, Tring. It was

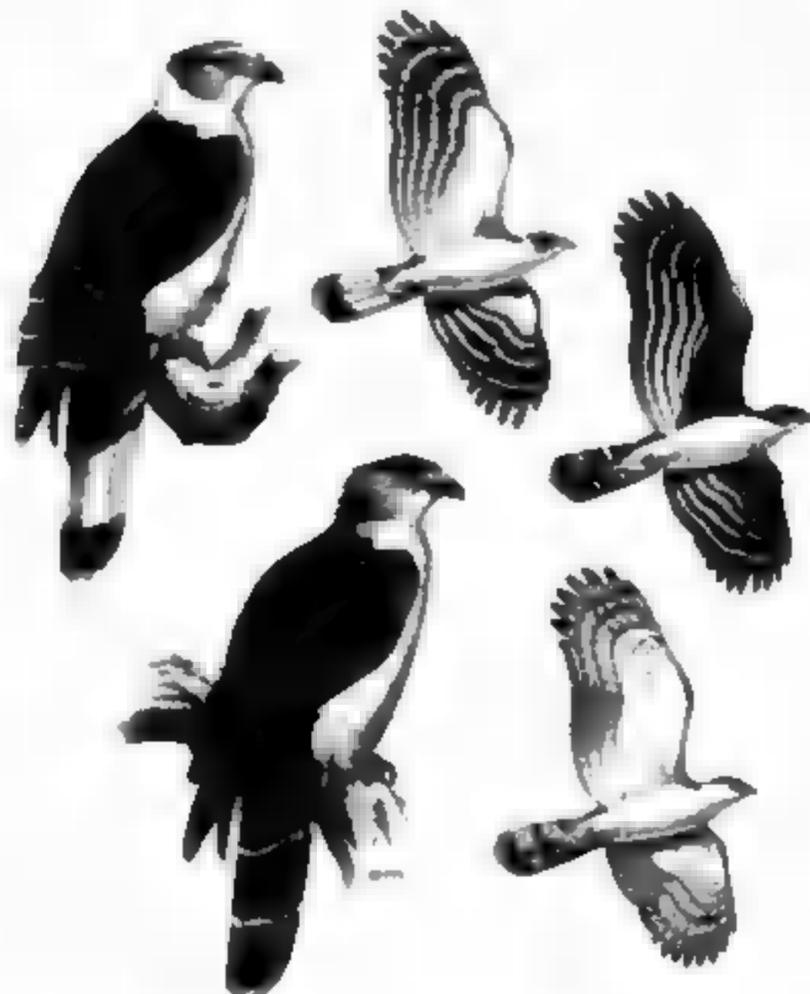


Fig. 22. Adult Forbes's Kite *Leptodon forbesi* perched and in flight (top two), compared with Grey-headed Kite *L. cayanensis* [14], latter shown both as adult (lower left, centre right) and as flying pale-morph juvenile (bottom right). Note differences in patterns of forehead, hindneck, mantle and remiges on the perched adults, and in the colours of wing-linings and underpatterns of flight-feathers and tail in flight.

described by Swann as a distinct species, but summarily dismissed by Brown & Amadon as 'only a variant of the immature plumage' of Grey-headed Kite [14]. More recently, it has been reconsidered a separate species on the basis of three more old specimens from Alagoas in Museu Nacional, Rio de Janeiro, Brazil (Teixeira *et al.*), which are adult male, adult female and subadult female (Teixeira *in litt* 1992-93). Subsequent records came from two areas in Alagoas in the 1980s and one in Pernambuco in the 1990s. No descriptions of any of these have yet been published, but the specimen at Tring, which it might be misleading to describe as 'immature', is mostly in fresh-moulted plumage and apparently largely adult except for two or three old secondaries and some contour feathers (Carl Edelman, [JF-L]). It

differs from adult Grey-headed Kite in its whiter-grey forehead, whitish hind-collar, conspicuous white tips to mantle and remiges (which would become abraded) and, most strikingly, a single broad ashy-white tail-band (55-85 mm deep) and white wing-linings (fresh, and not retained from juvenile plumage). These last two features would both be obvious from below in flight, in contrast to the black wing-linings and thinly white-banded tail of adult Grey-headed. The Tring specimen's wing-formula is also different (including p7/8 longest, compared with p6/7 longest on Grey-headed).

**REFERENCES** BirdLife International (2000), Collar *et al.* (1992), Forrester (1993), Pinto (1964), Ruschi (1979), Sick (1993), Swann (1922), Teixeira *et al.* (1987a/b), Wege & Long (1995)

## 15 HOOK-BILLED KITE

*Chondrohierax uncinatus* (Temminck, 1822)

Plate 12

**DISTRIBUTION** Neotropical and, marginally, Nearctic (26°N to 30°S); order 5; widespread but generally uncommon, or local and rare. Southernmost USA through Central America and tropical and subtropical South America: extreme southeast Texas (Rio Grande valley) and subtropical and tropical Mexico (in east especially, in west north only to south Sinaloa), southwards very patchily through Central America to Ecuador (seriously reduced) and northwest Peru on the western side of South America and, east of the Andes, through Colombia, Venezuela (generally north of Orinoco), Guianas, Brazil and eastern Ecuador and Peru to northeast Bolivia, Paraguay, north Argentina and north Uruguay; also Grenada and southeast Cuba (now rare in both); formerly Trinidad.

**MOVEMENTS** Perhaps mainly sedentary, but some altitudinal movement in lower temperate zone of Andes and occasionally small soaring flocks of up to 20-30 apparently on migration.



**HABITAT** Tall humid forest, ideally with dense ground cover and typically in tropical and subtropical lowlands, but also in lower temperate zone on wet premontane slopes of Andes, where extends to rainforest and high-altitude cloud forest, and in montane gallery forest in Cuba; sometimes gallery or secondary woodland in swampy areas, drier riverine woodland and, more locally, dry tropical forest and acacia thorn-scrub in Mexico, densely shaded coffee plantations in Surinam, mesquite woodland in Texas and thorn-scrub in one part of Colombia. Most important factor everywhere is abundance of tree-snails. Sea-level to 2,700 m, rarely 3,100 m, but mainly below 1,500 m.

**FIELD CHARACTERS** Medium-sized kite, with variably large and conspicuously hooked bill, heavy but rounded pigeon-like head, longish wings and tail, and short legs with weak feet. Perches in trees, usually skulking within canopy, but unobtrusive and sluggish rather than shy; wing-tips extend half way down tail. Polymorphic (two of three main adult morphs largely sex-linked), as well as much individual variation. Sexes normally dissimilar, but two commonest adult plumages best regarded as grey morph (mostly males) and brown morph (mostly females) with, additionally, third uncommon to rare dark morph (either sex); very little size difference, but female averages 5% larger and perhaps 14% heavier; juvenile also dimorphic (normal and dark) and distinct enough, but probably much as adult by early second year. All adults have distinctive face: more or less green lores, orange spot above, white eyes.

**PERCHED Grey adult (mostly males)** Slate-grey above with paler blue-grey head; whitish tip and broad grey central band on blacker tail (second, basal, band usually hidden); underbody all grey, paler than back, normally thinly barred with white, sometimes also with even thinner dark grey or rufous, rarely almost plain. **Brown adult (mostly females)** Dark grey-brown above with dusky to black cap, grey and rufous cheeks, rufous collar, and two grey bands on dark brown tail; underbody all rufous, narrowly to more boldly barred with creamy-white. **Dark adult** All slaty-black but for one or, more rarely, two broad white to grey-white tail-bands; some also have white abdomen. **Normal juvenile** Not unlike

brown adult, but yellow in front of brown eyes; rufous edges on back and wings; three narrower brown bands on tail; creamy-white collar (sometimes tinged rufous) and underbody, latter with variably spaced but always thin dark or rufous bars (sometimes all over or, at other extreme, largely confined to flanks and crissum). **Dark juvenile** Face as normal juvenile, but plumage all black-brown with buff to rufous edges above (and often on undertail-coverts) and two or three grey or whitish tail-bands. **Bare parts** Adult eyes white, juvenile brown. Adult cere and lores yellow through bright green to blue-green and lower mandible yellow to whitish, juvenile yellow; adult spot above bright yellow-orange, juvenile yellower. Adult legs yellow-orange to orange, juvenile yellow.

**FLIGHT** Medium-sized raptor with heavy and clearly hooked bill, prominent head, broad paddle-shaped wings rounded at tips and narrowed at bases, rather slender body, and fairly long tail usually closed; wingspan 2.0 times total length. Flies with slow flexible beats of slightly bowed wings interspersed with glides; glides and soars, though not usually for long or high, with carpals just raised above wing-tips and bases; circles low over canopy in reconnaissance; mostly flies within canopy. Best recognised by shape and flight because plumage so variable; adults' white eyes with orange and green in front often quite conspicuous at closer ranges, juveniles' yellower patches less so; bold barring on underside of primaries of both grey and brown adults and of dark juveniles. **Grey adult** Mostly shades of grey, darkest on back, upperwings and undersecondaries; blackish tail with single broad grey band above (second shows at base when spread) and two white bands below (one partly formed by crissum); fine-barréd wing-linings and dark grey secondaries look more or less uniform; boldly dark-barréd primaries below. **Brown adult** Darker grey-brown above, with blacker crown and nape, grey and rufous cheeks, rufous collar, rufous on inner primaries, and two grey tail-bands; wing-linings and underbody all rufous, finely cream-barréd; boldly dark-barréd primaries below (this time with rufous-cream wash on inners) and darker, greyer secondaries. **Dark adult** All blackish but for one or, rarely, two broad white tail-bands and thin white tip. **Normal juvenile** Patterned like brown adult, but rufous edges above, three tail-bands, creamy collar and underbody, latter with dark barring varying from all over to just flanks and crissum; wing-linings plainer creamy-buff, flight-feathers and tail much more thinly dark-barréd below, so whole underside looks paler and less contrasted. **Dark juvenile** Largely brown-black body and wing-linings, but rufous edges on upperparts and, especially, crissum; two pale tail-bands; primaries barréd black and white below, secondaries greyer and less boldly marked.

**CONFUSION SPECIES** Wide range of plumages apparently mimics various faster or stronger raptors that are otherwise different in shape or behaviour. Grey morph most similar in pattern to Grey Hawk [185] (dark eyes, small beak, clearer barring on underbody, pale underwings, no bold bars on primaries, more pointed tips, rapid beats, flat glides); combination of slate coloration and barring also not unlike adults of certain forest-falcons [261–264] (shorter-winged, longer-tailed, quite different in secretive behaviour). Brown adults and normal juveniles both bear resemblances in pattern to plumages of several buteos, including, in various parts

of range, Roadside [186], White-rumped [187], Red-shouldered [189] and Broad-winged [190], as well as to Bicoloured Hawk [148] and other accipiters [147, 149], juveniles of various forest-falcons [261–266] and juvenile Grey-headed Kite [14]. Rare dark morph has superficial resemblance to two similar but much more slender-billed food specialists: male Snail Kite [29] (broad white tail-base) and adult Slender-billed Kite [30] (all dark). Black plumage with single white tail-band could also cause dark morph to be confused with various buteonines: adult Slate-coloured Hawk [165] and Plumbeous Hawk [166] (both with different wing shape, bare parts orange) and two smaller black hawks [176, 177] (broader wings, shorter rounded tails, white at bases of primaries).

**VOICE** Probably silent outside breeding season. Noisy in courtship, and when disturbed at nest. Descriptions include rapid musical chuckling *wi-ti-ti-ti-ti-uk*, both from cover and in flight; soft conversational *hu-ey*, neither whistled nor hawk-like; musical whistle, like American oriole (*Icterus*); distinctive loud rattling, descending in pitch; and harsh chattering *hay-tet-tet* and shrill screams used when alarmed, against intruding raptors and probably in other circumstances.

**FOOD** Largely snails, these generally arboreal (e.g. *Homolonyx*, *Polymita*) or terrestrial (e.g. *Strophochelilus*) but sometimes also aquatic (*Pomacea*). Insects (including caterpillars), other invertebrates, and amphibians (frogs, salamanders) and freshwater crabs evidently taken casually; sometimes lizards (8% in study in Petén, Guatemala), supposedly also birds, but this seems unlikely. Still-hunts from perches in lower canopy and dense understorey; or actively forages inside cover, jumping from branch to branch and, if necessary, hanging upside-down to reach snail; rarely, uses more open or isolated perches in marshland. Also reconnoitres by circling low over trees or open ground, hovering and gliding, then swooping down to seize prey. Carries prey in bill to regular feeding places, where it transfers it to one foot, then removes aperture membrane, enlarges opening by chipping at shell, inserts hooked mandible and breaks whorls before swallowing snail and dropping characteristically holed shell (cf. Snail and Slender-billed Kites [29, 30]); damaged shells accumulate below. Small snails may be swallowed in shell (Sick).

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in twos or threes, but small flocks of up to 20–30 apparently on migration. Some reports of high soaring, but generally even mutual circling relatively low above canopy and of short duration. No other aerial displays described: this secretive kite of dense cover may depend more on voice.

**BREEDING** In Surinam, and probably other subequatorial latitudes, at least October–May and perhaps no fixed season; at slightly higher northern latitudes in north Colombia, Mexico and Texas, mainly March–July, but in Guatemala laying June–July. Thin flimsy structure (one nest 30 cm across and 11 cm deep was made of only 80 twigs) usually at 5–10 m, though in Guatemala average as high as 25 m, in main fork or on side branch of tree in indigenous forest or coffee plantation. (Clutch 1–2 (1–3). Incubation c.35 days. Fledging period not recorded.

**POPULATION** With total range extending patchily over some 15 million km<sup>2</sup>, including 4 million km<sup>2</sup> of

Amazonia, a good six-figure population might be expected. Skulking nature and limited flights above the canopy may also cause serious under-recording. Nevertheless, it is everywhere considered uncommon to rare and, often, declining. Thus, in some parts of Central America, only 'old records'; in Surinam and north Brazil, status changed from 'not uncommon' to 'uncommon'; elsewhere in Brazil and west Ecuador, for example, population 'reduced' or 'greatly reduced' by deforestation; and in north Argentina, where in 1960s 'not uncommon' (or, in Misiones, even 'common'), all but disappeared. Yet recent spread by 10–20 pairs into southernmost Texas indicates potential for range expansion, perhaps by displaced populations. For this specialist feeder, habitat destruction means loss of essential tree-snail prey. All in all, total in tens of thousands seems fairest guess. Island populations contribute little to this figure, however. The species has long been extinct in Trinidad and is now very rare in Grenada, where the local race was put at 15–30 in 1987. The yellow-billed Cuban form, which may well be a distinct species, is currently estimated at fewer than 250; it is threatened not only by forest destruction, but also because it is shot by local farmers (who mistakenly believe that it takes chickens) and because the tree-snails are being harvested.

**GEOGRAPHICAL VARIATION** Bill-size differs considerably within single populations, and not related to overall body size, colouring, age or sex: large-billed birds once treated as separate species or race ('*megarhynchus*'), but this due to individual variation which presumably enables broader spectra of snail sizes to be tackled. Apart from the polymorphic plumages, which puts this among the world's most variable raptors, three or four races usually recognised, though the two on the mainland are dubiously separable. The two island races are much less variable in coloration and bill size, and lack melanistic

morphs; the Cuban race, clearly long isolated, is sometimes treated as specifically distinct.

*C. u. uncinatus* (most or all of mainland range, from at least southeast Mexico through South America, formerly also Trinidad) See Distribution.

*C. u. aquilonis* (Mexico, west of Istmo de Tehuantepec, north to southeast Texas) Both grey and brown morphs slightly darker above and more broadly barred below.

*C. u. mirus* (Grenada) Smaller; male lacks subsidiary rufous barring below, female more rufous above and below; eyes pale green.

*C. u. wilsonii* (Cuba) Smaller still, both sexes with larger, yellow bill and barred collar; male paler grey above, grey-banded collar; female brownish-grey head, rufous-banded collar, all narrowly rufous-banded below; eyes yellow-green.

**MEASUREMENTS** *C. u. uncinatus* ♂ wing 265–301 mm, ♀ 268–321 mm; ♂ tail 173–210 mm, ♀ 191–228 mm; ♂♀ tarsus 31–37 mm. *C. u. aquilonis* ♂ wing 276–304 mm, ♀ 282–310 mm. *C. u. mirus* ♂ wing 250–265 mm (three), ♀ 269–270 mm (two). *C. u. wilsonii* ♂ wing 240–244 mm (two), ♀ 250–262 mm. **Weights** *C. u. uncinatus* ♂ 247–277 g, ♀ 235–360 g; *C. u. aquilonis* ♂♀ 215–353 g.

**REFERENCES** Amadon (1960, 1964), BirdLife International (2000), Blake (1977), Blockstein (1988), Bond (1979), Canevari (1991), Clark & Wheeler (1987), de la Peña (1992), Delnicki (1978), Fjeldså & Krabbe (1990), Fleetwood & Hamilton (1967), Friedmann (1954, 1950), Garrido (1985), Hartman (1961), Haverschmidt (1962, 1964, 1968), Hilty & Brown (1986), Howell & Webb (1995), King (1978/79), Marroquín *et al.* (1992), Meyer de Schauensee & Phelps (1978), Monroe (1968), Montiel de la Garza & Contreras-Balderas (1990), Olrog (1985), Orians & Paulson (1969), Palmer (1988), Paulson (1983), Raffaele *et al.* (1998), Ridgely & Gwynne (1989), Sick (1993), Shuf (1964), Smith (1982), Smith & Temple (1982a, b), Stiles & Skutch (1989), Thiollay (1989a/b, 1991b, 1993b), Voous (1969), Wheeler & Clark (1995), Wiley (1985, 1986b), Willis & Eisenmann (1979), Wotzkow (1986a).

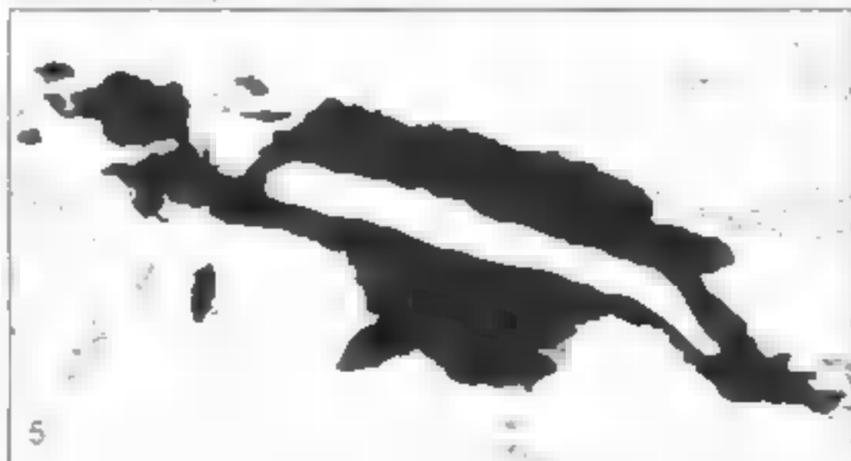
## 16 LONG-TAILED HONEY-BUZZARD

*Henicopernis longicauda* (Garnot, 1828)

Plate 10

Other names: Papuan Honey-buzzard, Long-tailed Buzzard

**DISTRIBUTION** Australasian (0° to 11°S); order 5; quite common. Endemic to New Guinea area: much of mainland New Guinea itself and many relatively small islands around western part (Irian Jaya), largest of which are Yapen, Biak, Waigeo, Batanta, Salawati, Misool and the Aru group



**MOVEMENTS** Apparently sedentary, but perhaps some dispersal by immatures.

**HABITAT** Lowland forest and forest edge, also secondary growth and some extension up into forested mountains. Sea-level to 3,000 m, but mainly below 1,800 m.

**FIELD CHARACTERS** Largish, elongated kite, barred above and pale with streaks below, with long tail, small head and slender bill; slight crest, formed by stiffened feathers of nape, makes for scruffy-looking head, but face lacks specialised loreal 'scales' of typical honey-buzzards [18–20]. Perches upright, or slightly hunched, usually skulking within canopy and often close to trunk; longish wings extend less than half down tail. Sexes similar, but female probably averages c5% larger; juvenile separable on good view, but perhaps indistinguishable from adult after first complete moult late in first year and early in second.

**PERCHED Adult** Brownish-black above, with whitish streaks on head and neck, broad brown-grey bars on

mantle and wings; tail more widely and evenly banded in same two colours, together with broader dark sub-terminal and pale tip; lower face and underparts cream to pale buff with blackish streaks, heaviest on breast. **Juvenile** Rather similar, but upperparts slightly lighter brown (nearer 'milk' than 'plain' chocolate) with more numerous grey-brown bars on mantle and wing-coverts, so looking altogether paler above; on tail, subterminal dark band and adjacent pale one much narrower; underparts richer buff with rather redder-brown streaks. **Bare parts** Eyes orange-yellow. Cere (also much of bill) and feet bluish-white.

**FLIGHT** Smallish to medium-sized raptor with small head, longish round-tipped wings often angled forward at carpal joints, noticeably broadest near usually well-fingered tips and pinched in at bases, with markedly curved secondaries, and long, broad round-ended tail; wingspan 2.2 times total length. Loose shallow beats; glides and soars on level wings, mainly just above trees except in aerial display. **Adult** Above, dark with pale bars, including four bands of each colour on tail; below, cream-buff body and wing-linings all finely but boldly blackish-streaked, while flight-feathers and tail clearly banded grey and blackish. **Juvenile** Distinguishable only by much narrower dark subterminal band on both tail and flight-feathers, but these should be obvious enough from below; in addition, adjacent pale band also clearly narrower on tail and primaries.

**CONFUSION SPECIES** Superficial resemblance when perched to Doria's Hawk [157] (particularly juvenile lacking adult's dark mask), which similar in size and basic pattern but much more lightly built, with clearly shorter wings that barely exceed base of only slightly shorter tail, distinctively longer and stronger legs, and marked RSD typical of bird-eaters, and has wings and tail multi-banded, broad white patch above and behind browner eyes, yellowish legs, and different flight and behaviour. When soaring, often misidentified as New Guinea Eagle [213], even though that is much larger and more robust, with relatively shorter and broader wings, and apparently rarely soars; it is also unstreaked below, with far less clear banding on flight-feathers and tail. Immature Brahminy Kite [41] differently shaped with rather longer and more rounded wings, much shorter tail, and no bands on quills. Other possible confusion groups include some large accipiters, but these also have shorter wings when perched and quite different outline and action in flight. Any unprecedented extralimital Eastern Honey-buzzard [19] would have shorter and unevenly marked tail, less barred upperparts and, in flight, less exaggerated shape and different underwing pattern (plate 10).

**VOICE** Generally silent, but 'goshawk-like series' of calls during display (Beehler *et al.*).

**FOOD** Wasps (both adults and larvae), also ants, grasshoppers and other insects, arboreal lizards, some small mammals and birds (including young domestic chickens) and nest contents. Forages mainly with flapping flight and long glides low over canopy, but also still-hunts, moving from perch to perch (usually close to trunk) and peering around; sometimes quarters steep open hillsides, or hawks flying insects low over forest. Follows wasps to nests and extracts larvae mainly with feet. Both diurnal and crepuscular in hunting.

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in pairs, sometimes trios. Single and mutual high-circling evidently frequent, but no sky-dance described. During mutual circling, as the two pass close, female momentarily flips over and presents talons, even touching male's talons.

**BREEDING** Evidently April–September or later (egg-laying female once shot in August). Twig nest, presumably lined with green leaves, usually high in tall tree, including crown of screw-pine, but once at only 7 m and occasionally on cliff ledge. No data on clutch size, or incubation or fledging periods.

**POPULATION** No information on numbers, but generally considered quite common and, with total distribution of 0.8 million km<sup>2</sup>, even average density of 1/100 km<sup>2</sup> would give population well into five figures. Range reduced where forest cleared, and in some areas becoming scarce; sometimes hunted.

**GEOGRAPHICAL VARIATION** Usually treated as monotypic but two island forms, *fraterculus* (Yapen) and *minus* (other archipelagos adjacent to Irian Jaya) are sometimes considered distinct, primarily for their smaller size, from the nominate race of mainland New Guinea: there, however, highland birds average larger than those of lowlands and it seems safer to regard all size differences as clinal. Black Honey-buzzard [17], which replaces this species in New Britain and was formerly considered conspecific, is clearly long isolated: proportions and, particularly, colour are very different, and the two are best treated as forming a superspecies. Although usually considered to be quite closely related to the true honey-buzzards *Pernis* (and specialising in similar range of prey), this genus may instead have evolved along comparable lines from a very different ancestor shared with four or five other genera endemic in the Australasian region.

**MEASUREMENTS** ♂ wing 331–439 mm (islands 331–368 mm, highlands 418–439 mm), tail 290–365 mm, tarsus 50–58 mm. **Weights** ♂ 447–630 g, ♀ 570–730 g. Lightest ♂ (447 g) a small '*fraterculus*', heaviest ♀ (730 g) a large highland bird.

**REFERENCES** Beehler (1978), Beehler *et al.* (1986), Bell (1971), Coates (1985), Diamond (1972), Finch *et al.* (1987), Gilliard & LeCroy (1967a), Majnep & Bulmer (1977), Mayr & Gilliard (1954), Rand & Gilliard (1967), Ripley (1964), Schodde (1993), White & Bruce (1986).

## 17 BLACK HONEY-BUZZARD

*Henicopernis infuscatus* Gurney, 1882

Plate 10

Other names: New Britain Honey-buzzard/Buzzard

**DISTRIBUTION** Australasian (4°S to 6°S); order 3–2; scarce to rare. Endemic to New Britain.

**MOVEMENTS** Presumably sedentary.

**HABITAT** Primary and partly disturbed lowland and hill forest, and forested ridges. Mainly below 1,600 m.



**FIELD CHARACTERS** Large kite, dark with pale throat and banded wings and tail, and having obvious affinities with Long-tailed Honey-buzzard [16], but rather smaller than mainland birds of that species and relatively shorter-tailed; likewise small head, slender bill and slight crest. Few descriptions of perched behaviour, but evidently not unapproachable: one gradually hopped up bent tree trunk until it reached relatively dense cover at about 8 m and there stayed for 30 minutes (Bishop); longish wings extend half way down tail. Sexes similar and female may average only c3% larger; juvenile probably indistinguishable in field.

**PERCHED All plumages** Mainly black above and blackish below, but for some white showing through on rear crown and nape, cream on throat, and buff on flanks and lower abdomen, especially on thighs and undertail-coverts; two very obvious brown-grey bands on secondaries and three, slightly wider, on tail. **Bare parts** Eyes yellow. Cere (with much of bill) yellowish. Feet bluish-white.

**FLIGHT** Medium-sized, dark raptor with small head, long round-tipped wings noticeably broad near fingered tips and pinched in at bases, with markedly curved secondaries, and longish round-ended tail; wingspan 2.3 times total length. Shallow beats; glides and soars on level wings, mainly just above trees. **All plumages** All black but for pale throat, mottled thighs and clear pale bands (brown-grey above and whiter below) on black to blackish-grey quills: two on secondaries, three on primaries, and three (one half-hidden) on tail. (Tail's blackish subterminal band behind brown-grey tip, broader than other

blackish bands on adult, may be narrower on juvenile, which otherwise distinguishable only in hand by more pointed primaries.)

**CONFUSION SPECIES** None. Only other black raptor in New Britain is dark morph of Meyer's Goshawk [154], readily distinguished by differently shaped and shorter wings, shorter tail, and far less obvious pale barring on both, as well as accipitrine behaviour.

**VOICE** Piped series of c12 accelerating upsturred notes.

**FOOD** Probably much as Long-tailed Honey-buzzard [16], but only lizards and spiders noted in stomach contents of specimens.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs. No displays described apart from high-circling. Indeed, may soar much less frequently than Long-tailed Honey-buzzard [16].

**BREEDING** No information. Specimens in breeding condition in May.

**POPULATION** Little known but, being restricted to forest on single island, total area of which is only 36,500 km<sup>2</sup>, population could hardly exceed lower thousands. In fact, the numbers are probably far less than that: there are only about 50 recent observations, all of singles or pairs, and Bishop saw just two in 22 months but, if this species does soar infrequently, as he suggested, it may well be significantly under-recorded. With such limited range, deforestation must loom as clear threat and, indeed, nearly all lowland and gently sloping hill forests there have already been cut or are under logging concessions.

**GEOGRAPHICAL VARIATION** Monotypic. Forms superspecies with Long-tailed Honey-buzzard [16] (which see for discussion of relationships).

**MEASUREMENTS** ♂ wing 340–358 mm, tail 250–265 mm, tarsus 53–57 mm. **Weights** No data.

**REFERENCES** Beecher *et al.* (1996), BirdLife International (2000), Bishop (1983), Clay (1994), Coates (1985), Collar & Andrew (1988), Hornbuckle (1999), Orenstein (1976), Schodde (1978).

## 18 WESTERN HONEY-BUZZARD *Pernis apivorus* (Linnaeus, 1758)

Plate 6

Other names: Honey Buzzard, European/Eurasian Honey-buzzard (but spends more than half of life in Africa)

**DISTRIBUTION** Palearctic (67°N to 37°N) and, in winter, Afrotropical (mainly c10°N to equator, less numerous to c30°S); order 7; common in main ranges but, except on migration, often overlooked and underestimated. Breeds western Eurasia: most countries of continental Europe (from south Norway, north-central Sweden, central Finland and subarctic Russia south to central Portugal and Spain, north-central Italy, locally former Yugoslavia and north Greece, European Turkey, and western and northern Ukraine), east across Urals into western Siberia and thence south to upper regions of River Ob at c85°E; also parts of Asiatic Turkey, Crimea, Caucasus, and Caspian Iran; small numbers Britain; generally absent as breeder south and east Iberia, southernmost France,

south Italy, west and south Balkans and, indeed, most Mediterranean hinterlands and islands (apart from north-east Spain, northern Italy, Corsica and, locally, west Turkey).

**MOVEMENTS** Highly migratory: winter reports in Eurasia exceptional and mostly questionable. By October few in central Europe, though some still in Mediterranean region and Middle East; by November very few anywhere north of Africa and those probably juveniles. Majority move south mid August to mid September and return mid April to mid June, especially May, thus spending no more than one-third of year in Eurasia and nearly two-thirds in Africa. Geography and winds produce differences between spring and autumn routes, and variations in annual and daily patterns. Autumn departures of thousands from Sweden concentrate at southern tip (Falsterbo), while spring arrivals chiefly farther



west through apex of Denmark. In Mediterranean region, huge concentrations occur at either end, while others cross the middle via Italy and central islands. West European birds travel to and from Africa chiefly via Straits of Gibraltar, where sometimes 11,000–13,000 in one day and usually 60,000–120,000 per autumn (117,175 counted in 1972), but wind conditions can push main arrivals up to 100 km or more west or east of narrowest crossing and, in autumn, some juveniles may head out for Africa from Capes Sagres and St Vincent more than 300 km to northwest. Although migrating typically by soaring, can negotiate wide stretches of water better than hawks do; individuals or flocks anywhere may also travel by flapping flight early in day before thermals rise. East European and Asiatic populations move chiefly through Middle East, but numbers passing over any one area differ greatly between spring and autumn, and from year to year: in western and central Israel, always relatively few in spring, but total autumn count at Kafr Qasim in 1986 was 419,164 and several single days in other autumns have produced over 100,000 apiece; contrastingly, in southeast Israel, few in autumn, but spring totals at Eilat have varied – again probably chiefly through wind strengths and directions – from 118,914 in 1988 to remarkable 851,598 in 1985, and single days have twice delivered over 220,000. In autumn, apart from main passage being farther west from Eilat, down the central highlands and nearer the Mediterranean coast (including many over Cyprus), some may pass well to the east of the Dead Sea and, since migration now known to be regular in, for example, south Kazakhstan and Yemen, perhaps even through countries where this species usually regarded as rare (Iran, Iraq, Saudi Arabia). Elsewhere, totals of thousands or, in some cases, tens of thousands have been recorded in spring over northeast Tunisia (Cap Bon),

passing on through Malta and Sicily; and, especially in autumn, around both ends of Black Sea into Turkey (notably Bosphorus in northwest, Arhavi and Borçka in northeast, Gulf of Iskenderun in southeast). Northward spring passage across Sahara probably more on broad front, while autumn numbers largely channelled through west and east. Vagrants have reached Iceland, Faroes, Ireland, Canary Islands and Seychelles. Although wintering in much of sub-Saharan Africa from Liberia and Kenya south to Angola/north Namibia, Zimbabwe and eastern South Africa, regarded as no more than scarce or uncommon, though regular, in many areas: this doubtless due partly to its being inconspicuous and solitary ground-feeder in rich woodland, and so often overlooked, but partly also because most significant winter quarters appear to be in less studied regions of Cameroon and Gabon into Central African Republic and, especially, northern DR Congo. Most juveniles remain in Africa until their second spring.

**HABITAT** In Eurasia, boreal and temperate open forest and woodland, commonly beech *Fagus* or other broad-leaf, often mixed or, in Scandinavia and Britain, mainly conifer (including introduced Douglas fir *Pseudotsuga* and Sitka spruce *Picea sitchensis*), especially where broken by glades, rides and heathland, but also in smaller woods in more open or cultivated areas, chiefly in lowlands or foothills; only occasionally in or near built-up areas (e.g. in central Europe). Much migration over open country of all types. In Africa, mainly equatorial forest edges and clearings, and rich but less densely canopied tropical and subtropical woodland and wooded savannah. Sea-level to 1,000 m, locally to 1,500 m, even almost 2,000 m (highest areas Caucasus, Pyrenees and, in Africa, Kenya uplands).

**FIELD CHARACTERS** Largish kite, superficially *buteo*-like but quite unrelated and relatively slim, extremely variable in colour and pattern of underside, with small slender bill (fairly straight-looking because of limited curve on upper mandible), small narrow head projecting from solid shoulders, long wings and longish tail (both shorter on juvenile), and strong but relatively straight-clawed feet adapted for walking and digging, not grasping; forehead and lores covered with small scale-like feathers to protect against hymenopteran stings, nostrils angled slits, and tarsi half-feathered in front. Mostly solitary, unobtrusive and sluggish rather than shy; perches with body aslant or, when alarmed, more upright within or below tree canopy, or stands more horizontally on ground, neck often somewhat extended; walks easily and can run; wing-tips well down tail, on adult usually reaching subterminal band or at least halfway beyond more distal of other bars. Polymorphic. Sexes rather similar, but distinguishable by head and eye colours and patterns of flight-feathers and tail; little size difference, though female 1–3% larger and 8% heavier; juvenile distinctive; much as adult after first moult (beginning about January), but juvenile flight-feathers and tail retained through most of first-summer (moult of remiges starts in June of second year). **PERCHED** All plumages Partly through sex and age differences in colours of head and flight-feathers, tone of upperparts, markings of tail and sharpness of patterns, but more particularly through exceptional range of colour morphs affecting mainly underside of body

and wing-linings, honey-buzzards more variable than any other raptor (see Geographical Variation, where range of morphs discussed). **Adult male** Except for melanistic birds, which usually darker above, general tone of upperparts more or less grey-brown, with greyer crown, clear grey sides of head, and greyish tinge to secondaries; finely vermiculated tail may have greyish or pale brownish cast, and creamy-white tip (unless abraded), but shows contrasting broad dark subterminal band and two narrower bars near base (one part-hidden by coverts); throat usually white or whitish, sometimes with fine dark shaft-streaks, but on darkest birds may be all dark; rest of underbody most typically white, sometimes plain, or cream or pale rufous, usually with close and well-defined strong barring of cinnamon, rufous, brown or blackish to black, sometimes less dense barring or black blotches or spots, or sparser browner spots, or largely rufous to dark brown, with or without obscure pale barring, to all blackish. **Adult female** Mainly darker and browner above, with any greyish tinge on head confined largely to lores; more uniform-looking secondaries and narrower subterminal band on browner tail, which often shows three thinner bars at base (two clear and one part-hidden); almost as variable as male below, but no plain white-bodied morph and, indeed, ground colour generally creamier to buff with usually less sharp barring (which may be sparse or quite heavy) and often more brown-blotched or mottled, even looking uniform brownish; melanistic morph may be all blackish or have pale throat and show whitish spots on nape and breast, even broken whitish bars on flanks, thighs and crissum. **Juvenile** Mainly brown to chocolate-brown above, sometimes blacker or more rufous, with thin white tips to secondaries and greater coverts, paler birds also variably light-mottled on shoulders by white-edged lesser and median coverts or broadly whitish-striped on mantle and scapulars; including narrow subterminal, usually four to five evenly spaced tail-bars of equal width, all thinner, less clear-cut and less distinct than adult's; never any grey, but head generally lighter brown to whitish or even white, when blackish eye-patches usually conspicuous, or can be dark-capped above whitish cheeks ('skua-type'); underbody most commonly olive-brown or dark brown, less frequently blackish, sometimes solid or blotched or variably streaked rufous or buff (occasionally few bars on belly), and sometimes all cream or whitish but for variable dark shaft-streaks on breast and flanks. **Bare parts** Adult male eyes orange-yellow to orange-red (but not dark red: cf. Eastern Honey-buzzard [19]), female yellow, juvenile brown, paling to grey-brown. Adult cere dull dark grey, juvenile yellow. Legs yellow.

**FLIGHT** Medium-sized raptor often confused with unrelated Common (Steppe) Buzzard [203], but slimmer in build, with small head (usually likened to cuckoo or pigeon) looking stretched forward and upward on relatively slender neck, narrower (but still quite broad) and proportionately longer wings, especially as result of longer hands (likewise rounded and inconspicuously five-fingered: cf. Eastern Honey-buzzard [19]), while usually clearly longer tail (more equal to or exceeding breadth of wing-bases) has slightly convex sides and often notched centre when closed and, through shorter outermost feathers, well-rounded corners (but tail of ground-diggers can become heavily abraded); wingspan 2.4 times total length. In steady active flight, deep and

characteristically elastic wingbeats can seem to have unusually mechanical quality because of curious measured emphasis on relatively high upstroke; wings may then have strikingly parallel edges, but at other times narrowed hands, bulging secondaries and pinched-in rear edge to wing-bases give different outline (this most marked for juveniles, which, in any case, have relatively shorter, narrower and thinner-handed wings, as well as rather shorter tail and sometimes shorter-looking neck); glides with wings slightly arched and more or less well angled, wrists variably thrust forward and hands back, flat or depressed together or alternately, but arms more at right-angles to body and wing-tips less pointed than most *buteos* ('more frayed effect at tip'); like other kites, tail often twisted sideways in manoeuvring; unlike Common Buzzard [203], soars with wings flat and straight out at right-angles to body, at most only hands slightly raised or, more often, depressed, tail more or less widely spread; does not hover. **Adult male** Typically grey-brown above, greyest on head, flight-feathers and, more variably, tail, but dark morphs may have darker head, upperbody and forewings; distinctive tail pattern of broad blackish subterminal band (terminal when tips worn) and two thinner bars at base, echoed on wings by broad blackish trailing edges, dusky tips to greater and primary coverts, and one to two bars variously visible at bases of slightly more translucent primaries; some show slight white barring and, in fresh plumage, greyish tips on uppertail-coverts; from below, body and wing-linings extraordinarily variable from white through buff and rufous to blackish, and plain or lightly spotted to heavily blotched or, most characteristically, cleanly and distinctly barred (see preceding paragraph); large and elongated dusky carpal patches (which do not, of course, stand out on darker morphs); flight-feathers translucent and usually greyish-white to whitish below, though secondaries may be darkish grey on darker morphs, with sharply defined and contrasting black trailing edges and finger-tips, and two basal bars on outer wings converging inwards and disappearing under inner wing-coverts; undertail similarly translucent whitish with clear-cut broad subterminal band and two bars at base (one largely hidden by coverts unless tail spread). **Adult female** Variation comparable to adult male, but browner above and altogether less distinctly marked, especially on upperwings, where dark trailing edges and other bars hardly stand out from more uniformly dark secondaries; yet contrast provided there by relatively paler bases to primaries, which form lighter patches against the dark wing-tips; perhaps greater tendency than male to greyish-white on uppertail-coverts; both above and below, tail has narrower subterminal band and often three basal bars less close together so that two are clear of coverts and third visible only when spread; below, no plain white-bellied morph, and usually creamy to buff or brownish with less sharply defined barring or blotching varying from sparse to heavy, but generally tending to look less contrastingly patterned and often rather uniform; melanistic morph may show pale throat and broken whitish bars on flanks, thighs and crissum (see preceding paragraph); more importantly, secondaries less translucent and looking clearly darker than pale primaries, particularly so on darker morphs, while dark trailing edges and wing-tips less clear-cut and the two or, sometimes, three other bars

fainter, thinner and more widely spaced (corresponding to tail), with one to two extending from primaries right across to axillaries and leaving relatively narrow pale strip in front of wing-tips and trailing edges. **Juvenile** Mostly brown to dark brown above, with inconspicuously barred pale primary-patches standing out from dark secondaries; secondaries and tail have thin white tips in fresh plumage, but white line along tips of greater coverts usually more obvious; sometimes also scattered whitish tips on mantle and scapulars, and often whitish U on tail-coverts; tail rather obscurely marked with four to five evenly spaced darker bars (less clear than adult's and subterminal hardly wider than rest); paler morphs show variably white-mottled or whitish forewings, more conspicuous white U on tail-coverts, even white head with black eye-patches or dark cap above whitish cheeks; dark eyes and extensive yellow cere sometimes obvious at closer ranges; underbody and wing-linings usually olive-brown or dark brown, sometimes blackish, or whitish, buff or rufous and variably plain or mottled or, most commonly, streaked (but not barred except, at most, on lower belly, flanks and axillaries); darker morphs usually show characteristic greyish-white band along greater underwing-coverts, while lighter ones have much less distinct carpal patches than adult's though any traces are still elongated (not rounded); flight-feathers less translucent than on adults, and secondaries often solidly dark grey, even blackish, while obscurely barred pale-based primaries have much more extensive dark tips covering whole of fingers; if dark bars visible on secondaries, they and the four to five on tail are all evenly spaced, rather narrow, and not sharply defined; as on upper side, thin white tips to secondaries and tail. **First-summer** Any immatures reaching Eurasia tend, by May, to have many adult feathers on body and coverts, but juvenile flight-feathers and tail by then abraded and often bleached.

**CONFUSION SPECIES** In reported small area of breeding overlap in central Asia, needs to be distinguished from very similar Eastern Honey-buzzard [19] (larger, heavier, shorter-tailed, broader-winged, six-fingered, more or less crested, with differences in barring on flight-feathers and tail, no carpal patches, often distinct gorget and other underbody and wing-lining characters arising from different set of 'models': see Geographical Variation). As Western winters in Africa, and Eastern in India and southeast Asia, confusion generally not otherwise considered widespread problem, but now that mixed flocks are known to migrate through southern Kazakhstan in autumn - while one Russian museum specimen of Eastern Honey-buzzard is from Caucasus (Edelstam *in litt*), and single adults have been photographed in Israel, Turkey and United Arab Emirates in May, September and December and, most recently, identified in Egypt in May - possibility of vagrants of either species migrating 'wrong' way should be borne in mind. Otherwise, main risk of confusion in Palearctic is with races of only slightly less variable Common (Steppe) Buzzard [203], which is more thickset with squat rounded head, shorter and broader tail (can look quite long when gliding), and broader wings with shorter hands (generally more pointed, especially when gliding), has shallower stiffer beats, glides on more curved wings and soars on raised (but recently fledged

juveniles have floppy flight and wings not raised above body level); also, except in more unicolorous Steppe Buzzards, often shows pale U on breast. Adults of both usually distinguishable by patterns of underparts, flight-feathers and tail, as well as bare-part colours, but beware that juvenile Honey-buzzards of the common dark morph, and of the scarcer buff, rufous and melanistic morphs, can have rather similar counterparts among young *buteos*, and are also less distinctive than their adults in shape: then distinguishing features include juvenile Common Buzzard's evenly rounded tail (sharp-cornered and unnotched), paler-based secondaries, thinner multi-barring on flight-feathers and tail, rounder carpal patches (not visible on darkest birds), and less extensively yellow bill. Much less likely to be mistaken for Rough-legged Buzzard [209], but in Middle East and North Africa consider Long-legged [206] (dark morph particularly) and in East Africa Mountain Buzzard [204]; also possibility of confusion of darker morphs with juveniles of Black Kite [39] (thinner wings, forked or triangular tail with sharp corners) and Northern Marsh Harrier [100] (compact head, glides and soars on raised wings), and of white morph only with Osprey [8] (little real similarity apart from whiteness, carpal patches and thin head). In Palearctic, the only 'models' (for underbody and wing-linings: see Geographical Variation) are Booted Eagle [230] (pale and dark morphs have comparable white and blackish-brown underbody and wing-linings, but all-blackish flight-feathers except for pale wedge on inner primaries, no carpal patches, plainer sharp-cornered tail, different shape and flight) and Short-toed Snake-eagle [67] (strongly marked adult corresponds to barred-morph adult Honey-buzzard, and pale juvenile to whitish-morph juvenile Honey-buzzard, but much larger, broad-headed, no carpal patches, different tail pattern, variably slightly darker fingers instead of neat black fingers or finger-tips). In Afrotropics, these and many other 'models' include Wahlberg's Eagle [229] (darker morphs, usually dark brown, may be melanistic or olive-brown like both adult and juvenile Honey-buzzards, while uncommon pale morph has underbody and wing-linings not unlike whitish juvenile Honey-buzzard, but always dark flight-feathers and tail); and Ayres's Hawk Eagle [232] (black-spotted male, black-blotched female, sparsely spotted immature, buff juvenile and melanistic morph all have Honey-buzzard counterparts, but eagle has bigger head, shorter and broader wings, closely barred flight-feathers and tail, fully feathered legs); see also Long-crested Eagle [235], Casin's Hawk Eagle [236], all snake-eagles [67-72], African Goshawk [111] and Great Sparrowhawk [151]. Finally, beware that in head-on approach large female accipiters, including Northern Goshawk [153] in Palearctic, can give very similar impression of level wings, small head and broad chest.

**VOICE** Normally quite silent except when nesting, and even then, though individually variable, often much quieter than many raptors: most likely to call when young growing in nest, but can be very vocal in week or so before leaving breeding area. Mournful whistling varies from relatively short *glee* to, more commonly, disyllabic *glee-ah* or *glee-oo*, long-drawn *gleewheeroo* or multi-syllabled *gvo-glee-er-ee-oo* quite different from adult *buteos*, but disyllabic version not unlike young Common

Buzzard [203] or, at times, even young Northern Sparrowhawk [145]. Used in flight or perched, as contact between pair-members – length, strength and pitch varying with emotional state – as well as against intruding raptors and during human disturbance at nest. Other calls include rapid excited clicking at nest relief, and *küick* resembling Tawny Owl *Strix aluco*.

**FOOD** Throughout year, primarily combs, larvae, pupae and, to varying extent, adults of social wasps, bees and hornets; also, especially when these hymenopterans and their nests scarce or hard to find, takes other mainly social or larger insects, earthworms, lizards and small snakes, frogs and newts, small mammals, nest contents of mainly smaller birds (to size of Woodpigeon *Columba palumbus*), and berries and other fruits. Frogs and newts most regularly taken from shallow water early in breeding season before wasps and bees fully active. If weather adverse on first arrival in Scandinavia, often attacks colonies of Fieldfares *Turdus pilaris* sometimes one becomes so soiled by the defending adults' faeces that it may be unable to fly and even die from starvation. Normally watches from inconspicuous perch or in flight at heights of 3–5 m, then follows foraging wasps back to their nest, which, if hanging in tree or under eaves of house, it may then snatch off, but, when in ground, it has to dig with its feet, and to lesser extent bill, sometimes to depths down to 40 cm; bird may then be almost hidden and can sometimes be closely approached or even hand-caught when digging. Also catches insects on wing in hill, notably flying ants in Europe in July/August and alate termites in Africa; forages on foot for beetles, small mammals and berries, travelling thus up to 500 m or more.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs except on migration, when also roosts socially, at times in huge numbers, in trees or on ground in desert; frequently ones and twos even on passage, or strung out in thin streams, but often small groups and sometimes hundreds or even thousands loosely together. Single and mutual high-circling frequent over breeding area, and undulating sky-dance includes distinctive wings-high

posture unknown in any accipitiforms other than *Pernis* after long glide, swoops steeply up on spread wings, stalks, and quivers or shakes vertically raised wings around three to seven times before either continuing upwards in swooping stages interspersed with wing-quivering, or plunging downwards on partly closed wings in similar steps broken by upward swoops and wing-quivering; sometimes feet are dangled; usually silent; either performance may involve up to 40 undulations over several kilometres as advertisement of home-range occupancy and can last up to 30 minutes. Full sky-dance by adult male only, but females and immature males may perform more subdued version with gentle quivering of less vertical wings following level glide or shallow upward swoop. Carpal patches and distinctive patterning of undersides of flight-feathers and tail (not shared by 'model' eagles: see 'Confusion Species' and Geographical Variation) presumably significant in wings-high postures of pair-formation and home-range advertisement.

**BREEDING** June–mid September (mid May–end September), so young reared when wasps and bees most abundant. Nest mainly of leafy sprays, 60–80 cm across and 20–25 cm deep when new but larger if based on old nest of corvid or buteo, thickly lined with greenery, at 10–25 m in broadleaf tree (often on lateral branch of, especially, beech or oak) or conifer (especially spruce *Picea* or, locally, introduced Douglas fir *Pseudotsuga*) near edge of wood or clearing, or deeper within wood, often on southwesterly slope near head of valley. Clutch 2 (1–3). Incubation 30–35 days. Fledging 40–44 days; independence 75–100 days later.

**POPULATION** Few data on breeding densities and, because this species inconspicuous and easily overlooked, many national figures doubtless underestimates. More recent of these indicate at least 35,000 pairs in Europe excluding former USSR – of which 8,000–12,000 pairs in France, 5,000–10,000 in Sweden, 4,000–8,000 in Finland, 3,600–5,800 in Germany (alternative figure of 7,700 considered probable overestimate), c2,500 in Poland, 1,500–2,500 in Latvia, 1,500 in Austria, 1,000–2,000 in Spain, and hundreds in each of several more coun-

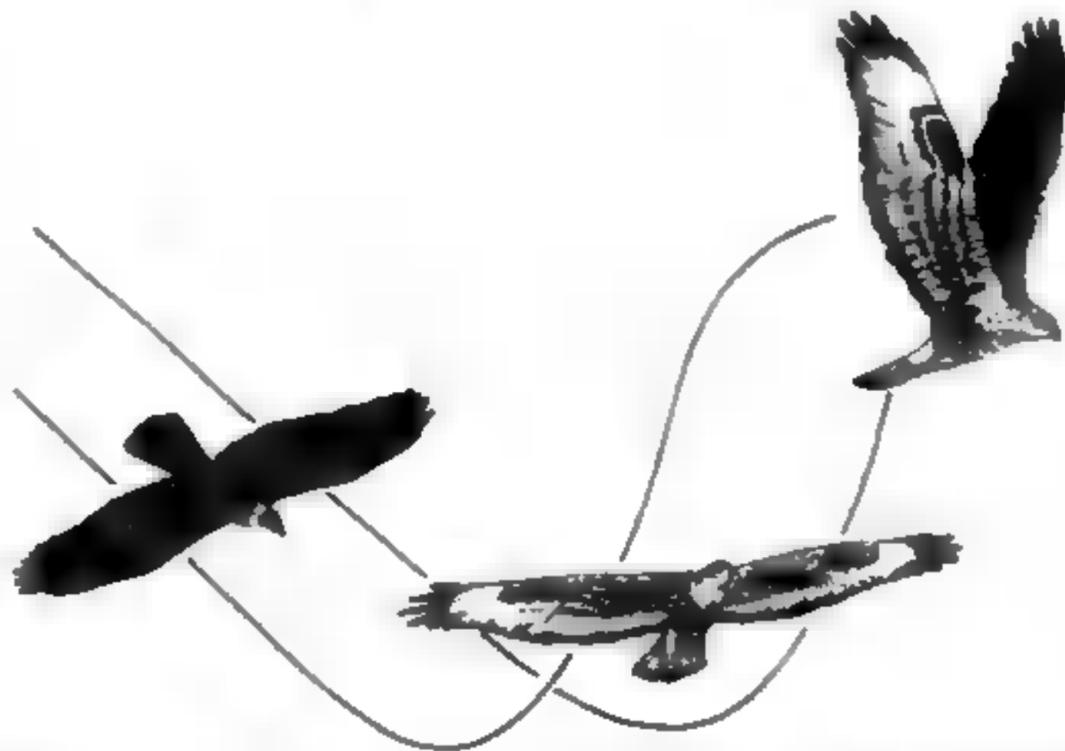


Fig. 23. Sky-dance of Western Honey-buzzard *Pernis ptilorhynchus*. Rollercoaster displays are typical of many raptors, but this genus is distinctive in quivering upstretched wings at the top of each undulation. The upward swoops and wing-quivering may be interspersed either with simple speed-gathering descents on spread wings, as here, or with deeper plunges on partly closed wings – these differences tending to result in a gradual gain or loss of height over the whole switchback.

tries – while population of European Russia now put at 100,000 pairs (as well as 900–1,000 pairs in Belarus, but possibly only 50–70 pairs in Georgia). Comparable total may perhaps be assumed for western Asia. Even so, the sum of all these estimates is little more than 250,000 pairs. From another angle, the breeding distribution extends over more than 10 million km<sup>2</sup>: recorded home ranges variously cover 10–50 km<sup>2</sup> (though woodland density may be as high as 1 pair/2.5–5 km<sup>2</sup>), so an even spread without overlaps might suggest between 200,000 and 1 million pairs. Spreads are seldom even, however, and the latter figure is probably far too high, but, equally, neighbouring home ranges often overlap to large extents and the former is certainly too low. Even if count of over 850,000 birds passing over Eilat in spring 1985 (see Movements) represented the whole adult population that migrates around the eastern Mediterranean, a breeding total of over 500,000 pairs is indicated, allowing for those not seen, or reaching Eurasia farther west or east; and that figure takes no account of first-year birds remaining in Africa. If over 500,000 pairs reared one chick apiece, it seems reasonable to suggest that at least 1.5 million, perhaps even 2 million, Western Honey-buzzards may then travel south in autumn to join the survivors of the yearlings that remained in Africa, which after a good breeding season might originally have totalled half a million. But breeding success, and even nesting attempts, depend very much on summer weather conditions and resulting wasp populations, so that fluctuations are considerable (recorded averages 0.89 to 1.56 young per successful nest) and in cold wet summers very few young may be reared; indeed, in 1998, Kostrzewa considered that entire population probably fluctuates between 500,000 and 1 million individuals. Otherwise, population declines reported in some countries (Norway, Sweden, Finland, Denmark, Germany, Italy, Hungary, Balkans) have mostly been related to deforestation (or replacement of open broadleaf with unbroken conifer) and shooting, but human disturbance alone, even recreational pressures in the general area, can also be significant. Thousands are still shot annually in various Mediterranean countries from Spain and Morocco to Balkans and Middle East, but especially Italy and Lebanon, which must affect the populations concerned: on Malta, for example, estimates of numbers shot annually rose from 500–1,000 by 1986 to 500–1,500 by 1991. In north Europe, early adults (through shortages of alternative prey, or injudicious predation, in adverse weather: see Food) and late juveniles (through inability to fly and forage well enough) may starve, but it is difficult to judge the population significance of this and such other natural factors as falling victim to stronger raptors and owls (see Geographical Variation). In general, numbers on migration suggest that the species is maintaining itself reasonably well, though there are indications of some decline since mid 1980s, this countered to some extent by increases in Britain, Netherlands and, possibly, Russia. Little evidence of pesticide effects, perhaps unsurprisingly for a woodland wasp-eater (although contamination through, especially, locusts could well be a threat in African winter quarters, where controls on pesticide usage are few).

**GEOGRAPHICAL VARIATION** Sometimes considered conspecific with Eastern Honey-buzzard [19], but has

apparent overlap in breeding range and, though some with intermediate characters recorded, constant differences apparently include wing-formulae and presence or absence of carpal patches: the two seem better treated as forming a superspecies. Western Honey-buzzard is then monotypic but, in parallel with its eastern counterpart, polymorphic to extent of being arguably more diversified in colour and pattern (chiefly head, underbody and wing-linings) than almost any other wild bird species. Often lumped simply as 'typical', 'pale' and 'dark', about ten adult and seven juvenile morphs are distinguishable – some common, some much scarcer – with further intergrades: adults can be classed as 'white-bellied' (male only), 'densely barred', 'thinly barred', 'black-blotched', 'black-spotted', 'sparsely spotted', and the more unicolorous 'rufous', 'olive-brown', 'dark brown' and 'melanistic'; counterparts of the last four are also found in juvenile plumages, along with 'buff', 'light' and 'whitish' (see also under Field Characters). Each morph of this relatively weak insectivorous kite corresponds to an age-class or a colour morph of one or more mainly Afrotropical raptors, including six hawk eagles, seven snake-eagles and two large accipiters which, in general terms, are of comparable size (several of the snake-eagles are actually larger) but mostly heavier and all more powerful. Similar resemblances to mostly different small tropical eagles are found in both migratory and sedentary honey-buzzards of the eastern Palearctic, Indomalayan and Australasian regions, and it has been argued that these are examples of polymorphic plumage mimicry evolved to protect the relatively gentle and defenceless honey-buzzards from attack by more powerful tropical raptors (see Edelman & King, also p.62); in the north of the breeding range, where protective 'models' absent, honey-buzzards are sometimes taken by both Northern Goshawks [153] and large owls *Bubo/Strix*.

**MEASUREMENTS** ♂ wing 370–441 mm, ♀ 372–447 mm; ♂ tail 210–276 mm, ♀ 240–273 mm; ♂♀ tarsus 47–57 mm; **Weights** ♂ 440–943 g, ♀ 450 g–10.5 kg (one 360 g); may be 20–80% heavier in August (pre-migration) than in June (breeding).

**REFERENCES** Agostini (1992), Backhurst *et al.* (1973), Baha El Din & Baha El Din (1997), Beaman & Galea (1974), Beaman & Madge (1998), Bernis (1973, 1975), Bijleveld (1974), Bijlsma (1993), Britton (1980), Brooke *et al.* (1969), Brown (1970a, 1970b), Brown *et al.* (1982), Campbell & Ferguson-Lees (1972), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Doucet (1968), Edelman & King (in prep), Flint *et al.* (1984), Forsman (1984, 1994, 1999), Gænsbøl (1986, 1995), Glutz von Blotzheim *et al.* (1971), Hagemeijer & Blair (1997), Hallman (1985), Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1985), Harris *et al.* (1989), Holstein (1944), Irons (1980), Kemp & Kemp (1998), Kjellén (1992), Kostrzewa (1985, 1986, 1987, 1989, 1991, 1998), Kramer (1955), Moreau (1972), Münch (1955), Olech (1991), Palma (1985), Palma & Beha (1994), Pickford *et al.* (1989), Portelli (1994), Porter & Beaman (1983), Porter *et al.* (1981, 1996), Rasmussen & Storgard (1989), Roberts *et al.* (1999), Rufino *et al.* (1985), Shirihai (1996), Shirihai & Christie (1992), Shirihai *et al.* (1996), Steyn (1982), Stresemann (1940b), Svensson (1981), Thiollay (1967a, 1977a, 1989), Tjernberg & Rytman (1994), Trap-Lind (1962), Tree (1973), Tubbs (1993), Ulfstrand (1958), Ulfstrand *et al.* (1974), Utendörfer (1952), Vasic *et al.* (1985), Vaurie (1963), Wendland (1953), Witherby *et al.* (1939), Woodall (1971), Wortelaers (1940), Zimmerman *et al.* (1996).

## 19 EASTERN HONEY-BUZZARD *Pernis ptilorhynchus* (Temminck, 1821)

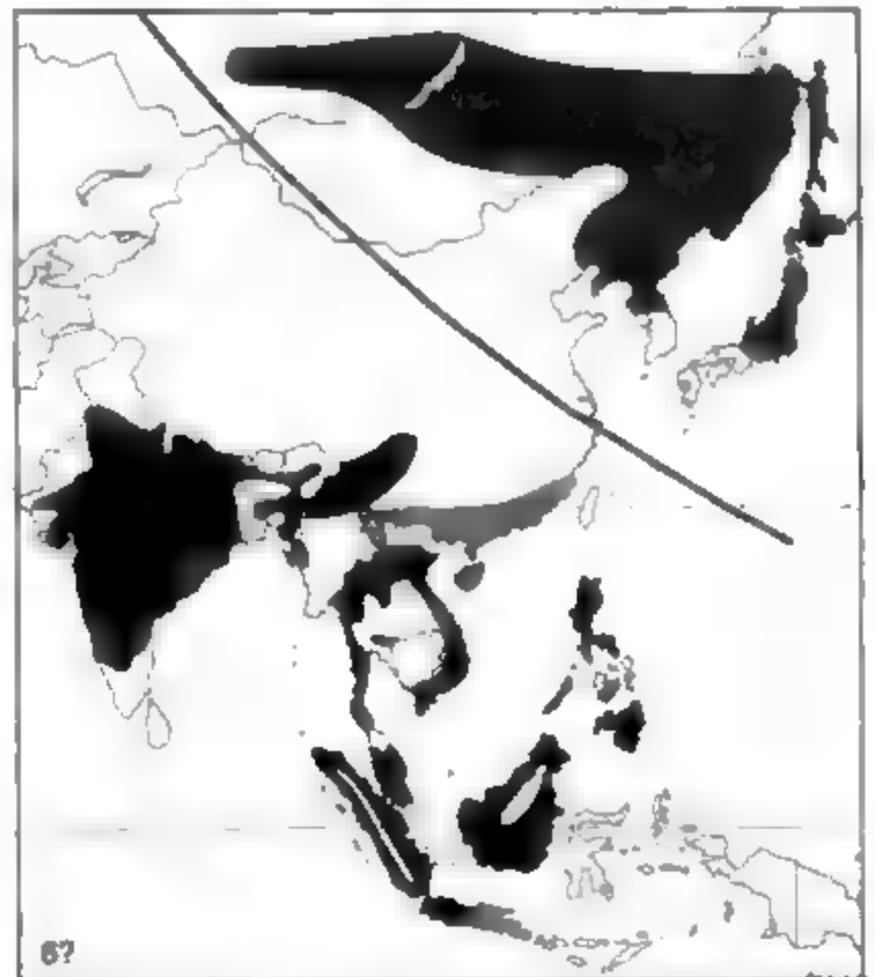
Plate 10

Other names: Oriental, Asiatic or Crested Honey-buzzard

**DISTRIBUTION** Eastern Palearctic and Indomalayan (57°N, possibly 62°N, to 8°S), but two distinct populations (migratory northern, with southernmost breeding limit at c36°N in east of range, and sedentary southern, with northernmost limit at c33°N in west, but minimum gap 2,000–2,500 km); order 6?; in most of breeding range regarded as uncommon to rare, but probably much overlooked. Asia: migratory northern population breeds southern Siberia from at least east of upper Ob through upper Yenisey and north Transbaikalia to Amurland, Ussuriland and Sakhalin, south into north Mongolia, northeast China (east Heilongjiang to Hebei), North Korea, and Japan (Hokkaido to central Honshu), but limits of Siberian range imprecisely known and may extend as far north as 62°N on middle Yenisey, where adults and display-flight seen, and possibly farther west into area of overlap with Western Honey-buzzard [18] (see 'Movements'); basically sedentary southern populations – which may form one or more distinct species (see Geographical Variation) – extend from north Pakistan and throughout much of Indian subcontinent (north to Punjab and foothills of Himalayas) south to Sri Lanka and east through Burma to south China (Yunnan), north Laos, west and south Thailand, peninsular Malaysia, Philippines, Borneo, Sumatra and Java.

**MOVEMENTS** Like Western Honey-buzzard [18], migrates by flapping as well as soaring and better able than hawks to cross considerable stretches of open water. Northern populations migrate south for winter, leaving Siberia from late August, and Japan from mid September, returning May and April–May respectively. Occasionally odd ones winter north to south Japan, but vast majority disperse down through Indian subcontinent and throughout more or less forested parts of mainland and insular southeast Asia from Burma and southeast China (including Hainan) to Philippines and Greater and Lesser Sunda, where casual east to Timor; apparently not Sulawesi, but could be overlooked there (see Confusion Species). No recorded passage on anything like scale of Western Honey-buzzard, but those from northern half of Japan and presumably Sakhalin pass through northeast Kyushu in late September (maximum 1,500 in one day) and early October, and thence along the Nansei-shoto to Taiwan and, probably, the Philippines. Few other data on numbers, but 1,500 passing through peninsular Thailand on one day in early October and, at southern limit of winter range, total of nearly 2,200 noted flying east over Bali during month from mid October. Much farther west, migration evidently regular through Chokpak Pass in southern Kazakhstan, near border with Kirgizstan, where 135 identified among Western Honey-buzzards in 13 days in early September 1993: this is over 10° west (and well south) of known western breeding limit, suggesting either unrecorded westward range extension or circular westward route around Tien Shan and Hindu Kush evolved to avoid crossing Himalayas. Vagrants have now

been found as far west as Caucasus, Turkey, United Arab Emirates, Israel (20+) and Egypt, the majority involving adults on return spring migration: it may well be that individuals are not infrequently caught up in migrating flocks of Western Honey-buzzards in autumn and may then even overwinter in Africa. Although basically sedentary, southern populations sometimes nomadic over considerable distances in response to food supply – return to Punjab region, for example, coincides with arrival of migratory rock-bees *Apis dorsata* – while some at least from northern India and Yunnan move south, even as far as Maldives, Sri Lanka, peninsular Malaysia and Java: recently recorded in Andaman Islands but, as in Sri Lanka, unclear whether these are migrants or local breeders. Many juveniles probably remain in winter quarters until their second spring.



**HABITAT** In Palearctic, broadleaf and mixed forest and other well-timbered lowland and hill areas – as Western Honey-buzzard [18], especially where broken by glades or other more open areas – but tropical habitats vary from rainforest to more open wooded country or even relatively small groves near villages, towns and cultivation, and in Pakistan irrigated forest plantations. Elsewhere in western Indian subcontinent, from Bahawalpur through Rajasthan to Gujarat, sometimes in semi-desert, but this perhaps mainly on passage, when seen over all types of open country. Sea-level to 1,800 m, but mostly below 1,200 m or, locally, to 1,500 m; and to 3,000+ m on passage.

**FIELD CHARACTERS** Largish slim kite, bigger than Western Honey-buzzard [18] but broadly similar in slender bill, projecting head, specialised face feathering, bigger but likewise rather straight-clawed feet adapted for digging, longish tail, and wide variation in colour and pattern; indeed, taking account of dark Indomalayan races and their greater range of colours of

upperparts, plumages almost more variable; but head not quite so small-looking because of more or less elongated feathers of hindcrown (forming distinct crest in some Indomalayan races); only migratory Palearctic population is long-winged, and has little or sometimes no crest; sedentary tropical races short-winged, even thinner-billed and, in some cases, clearly crested (see Geographical Variation). Like Western Honey-buzzard, solitary, unobtrusive and sluggish rather than shy; similarly perches within or below tree canopy, and walks easily; wing-tips more or less cover pale central tail-band on migratory Palearctic adult, but reach only base of it on sedentary southern forms. Polymorphism most marked in peninsular Malaysian and Greater Sunda race. Sexes rather similar, but distinguishable by head and, probably, eye colours and by patterns of flight-feathers and tail; little obvious size difference, and Palearctic female only 2% larger (if apparently c26% heavier) than male while Indomalayan female c7% bigger; juvenile distinctive; much as adult after completion of first moult. **General** Migratory east Palearctic race (with little or no crest), if not quite so varied as Western Honey-buzzard [18], likewise shows range of colour morphs affecting mainly underside of body and wing-linings, as well as small but clear sex and age differences in greyness of head and upperparts and markings of flight-feathers and tail; sedentary Indomalayan forms together show marked geographical differences (not least in crest development) but, though some more strongly polymorphic (including more wholly blackish dark morphs) and all with similar characters of sex and age, less individual variation.

**PERCHED Palearctic adult male** Greyish-brown above, with dark eyes emphasised by clearly greyer head; secondaries greyish with dark subterminal band and much narrower bar in middle; tail two-thirds blackish with contrasting broad central vermiculated greyish or pale brownish band and, especially in fresh plumage, creamy tip; usually creamy or whitish throat, often outlined by dark gorget and sometimes also partly or completely divided by median stripe, or gorget may be reduced to moustaches (cf. female Western); rest of underbody varies from cream to, more commonly, pale brown, tawny-rufous or blackish-brown, tending to be rather more uniform than Western Honey-buzzard, far less typically heavily barred and more usually blotched, mottled or streaked. **Palearctic adult female** Browner and less cleanly marked above, with any grey less pure and confined to lores and around orange-yellow eyes; secondaries pale brown with narrow darker barring and much less clear-cut subterminal band; more extensively pale and more vermiculated tail browner with pattern more like male Western, but still noticeably broad basal band (averaging broader than on male Western and clearly broader than on female); colour of underbody has similar range to male, including usually contrasting pale throat and, often, conspicuous dark gorget. **Indomalayan adults** Body tones and length of crest differ (see Geographical Variation), but tail pattern and greyishness of head of each sex, and often white throat surrounded by blackish gorget with or without median stripe, generally correspond to those of Palearctic race (see also 'Flight'), except that Philippine form appears to have narrower dark tail-bands and far lesser tendency to that throat pattern. At least the two most widespread

races, of Indian region and southeast Asia to Greater Sundas (which otherwise differ rather markedly, including crest length), have true melanistic morphs, in which patterns of remiges and rectrices are less contrasted and which are otherwise almost entirely dark sepia to blackish-brown; even then lores are usually grey, extending more on to other parts of head in males, and throat may or may not be white. The striking black-and-barred 'Tweeddale' morph of southeast Asia and Greater Sundas is also usually grey-lored and white-throated. **Palearctic juvenile** Brown to dark brown above, with thin white tips to secondaries and greater coverts; usually four to five evenly spaced tail-bars of equal width and often slightly broader subterminal; head and shoulders may be paler brown, sometimes whitish with dusky eye-patches; underbody most commonly plain dark brown, even blackish-brown, but sometimes streaked paler, or mainly tawny-buff or rufous to cream with blackish streaks. **Indomalayan juveniles** Similar range of plumages, but pale morphs (creamy underbody and more or less whitish head with or without dark mask) and, locally, rufous morphs both probably commoner. **Bare parts** Palearctic adult male eyes dark red (looking blackish against grey of head, compared with orange or yellow eyes of male Western Honey-buzzard), female orange-yellow, juvenile dark brown; males of Indomalayan races apparently have paler red eyes, juvenile sometimes greenish. Adult cere blackish-grey, juvenile yellow. Legs yellow. **FLIGHT** Medium-sized but quite bulky-looking raptor, perhaps more likely to be mistaken at distance for Short-toed Snake-eagle [67] than Common (Steppe) Buzzard [203], with well protruding but not particularly small head, long broad wings well rounded at 6-fingered tips, and broad medium-length round-tipped tail shorter than breadth of wing-bases: cf. Western Honey-buzzard [18], which looks far less eagle-like, with smaller head (no bulk provided by elongated rear crown), narrower and slightly more pointed wings (only five fingers), and narrower longer-looking tail (more equal to or exceeding breadth of wing-bases) often showing notched tip when closed; wingspan 2.4 times total length in Palearctic, but 2.0-2.2 in Indomalayan races. Flight similar to Western Honey-buzzard (which see), with deep elastic beats and high upstrokes, but action appears heavier and slower; glides with wings flat or slightly arched, and soars with them more or less flat at right-angles to body. **Palearctic adult male** Grey-brown above with grey head, like male Western Honey-buzzard, but prominent dark eyes (red, not orange-yellow); upperside of greyish secondaries shows not only broad dark subterminal band (terminal when tips worn), but second complete bar running whole length of wings; tail looks blackish with broad pale greyish or brownish central band and, especially in fresh plumage, creamy tip; from below, pale throat sometimes edged by dark moustaches (cf. female Western) or, much more often, encircled by distinctive dark gorget and variably also divided by dark median stripe; rest of underbody and wing-linings vary from cream or pale brown to tawny-rufous or blackish-brown, tending to be more uniform than Western Honey-buzzard, less boldly barred or blotched; variable blackish tips to primary and greater coverts, but no large carpal patches like Western, at most quite small black spot at leading edge of carpal area; translucent whitish or greyish undersides of flight-feathers show up sharply defined

and contrasting black trailing edges to secondaries and inner primaries, and small neat black tips to outer six primaries ('finger-nails', rather than 'finger-tips' of Western), while the outer of the two basal bars is farther from the coverts and runs the whole length of the wing; undertail looks two-thirds black divided in middle by broad translucent whitish band. **Palearctic adult female** Browner above (streaky grey only on sides of head), with wing and tail patterns less clear and not nearly so distinctive; narrow barring on primaries and secondaries, without broad dark trailing wing-edges on upperside; both above and below, tail has broad subterminal band and two bars at base (one largely hidden by coverts), so more like male Western Honey-buzzard but with exposed bar generally looking wider; from below, secondaries show dark trailing edges and three evenly spaced narrow bars, while the more translucent primaries also have extra bar halfway down fingers (not at bases of fingers as female Western); underbody and wing-linings much like male in colour and pattern, including often gorgeted pale throat and any carpal mark reduced to spot at leading edge. **Indomalayan adults** See preceding paragraph and Geographical Variation for similarities and differences in head, body and tail patterns; Philippine form appears also to have less strong barring on flight-feathers. **Palearctic juvenile** Most commonly, dark brown body and wing-coverts with, above, white line along tips of greater coverts and variable whitish U on tail-coverts and, below, corresponding but wider pale strip again along greater, but ground colour, as on Western Honey-buzzard, may be plain rufous or whitish or with dusky mottling or streaks; again like Western, wing-tips extensively blackish-tipped, pale primary-patches stand out above, and obscure barring (and, in fresh plumage, whitish tips) on flight-feathers and tail comparable, but less contrast below between primary bases and secondaries, so all flight-feathers appear more clearly marked with about three widely spaced bars and more distinct dark trailing edges; no carpal patches; similar extensive yellow cere and dark eyes sometimes obvious at closer ranges. **Indomalayan juveniles pale morph** (creamy underbody, pale forewings and more or less whitish head with or without dark mask) Probably commoner, and at least in Philippines black-streaked rufous morphs as well. **Palearctic first-summer** Any immatures reaching Palearctic Asia tend, by May, to have many adult feathers on body and coverts, but juvenile flight-feathers and tail by then abraded and often bleached.

**CONFUSION SPECIES** In central Asia (where breeding ranges may overlap), in southern Kazakhstan (where mixed migrations of both species apparently regular in at least autumn) and in Middle East and perhaps Africa (where vagrants may be more frequent than realised), needs to be distinguished from very similar Western Honey-buzzard [18] (smaller and lighter, smaller-headed, longer-tailed, narrower-winged, five-fingered, with differences in barring on flight-feathers and tail, usually strong carpal patches and absence of gorget all among underpart characters arising from different set of 'models'; see Geographical Variation). See under Western Honey-buzzard for frequent confusion in Palearctic with races (and young juveniles) of only slightly less variable but quite unrelated Common (Steppe) Buzzard [203]: Eastern Honey-buzzard's shape is generally more

distinctively different, but beware that narrower-winged dark-morph juvenile, with thinly barred flight-feathers and tail, can quite closely resemble dark-morph adult Steppe Buzzard, which has similarly broad dark trailing wing-edges. All other *buteos* of central and eastern Asia – Long-legged, Upland and Rough-legged [206, 207, 209] – have particularly strongly marked black carpal patches. With similar distributions in southeast Asia to Philippines and Greater Sundas, two other forest raptors with crest, more or less grey head, barred underparts and banded tail, but both clearly smaller, are Jerdon's Baza [11] (long upstanding crest white-tipped, no suggestion of gorget, long wing-tips near tail-tip, broader and more rounded wings, broader and more even barring below extending to wing-linings, closer banding on primaries, similarly unevenly banded tail but with much broader pale tip) and Crested Goshawk [109] (slight crest, heavy bill with yellow cere, wing-tips at base of tail, barring of even width on flight-feathers and tail, typical accipiter shape and flight). More interesting confusion species are the seven *Spizaetus* hawk eagles [237–243] which are the main 'models' for Eastern Honey-buzzard's polymorphic plumage mimicry: this applies especially to Wallace's [243] and Blyth's [242], whose plumage patterns and also size can be very closely matched by those of the race *torquatus* that shares their range in peninsular Malaysia and Greater Sundas (see Geographical Variation); but there can also be great similarities to adults (often more or less gorgeted and/or with median throat-stripe) and juveniles (often whitish-headed) of other *Spizaetus* hawk eagles there and elsewhere in the Indomalayan region, while different populations of the variably crested and dimorphic Changeable Hawk Eagle [237] can present comparable problems (in general terms, *Spizaetus* hawk eagles are big-headed with short and heavy deep-hooked bill, relatively short and broad rounded wings and long rounded tail, with differently patterned remiges and rectrices below, and of course fully feathered legs, but see individual species for particular identification points and scope of variation). Comparisons can also be drawn between males of Palearctic or southeast Asiatic mainland races of Eastern Honey-buzzard (showing black tail with broad whitish central band and correspondingly contrasting pattern on flight-feathers), especially dark morphs with barred or spotted underparts, or even pale-morph juvenile (including whitish head with dark mask) and corresponding plumages of Crested Serpent-eagle [74] (comparable size, but stockier and much bigger-headed with yellow cere and lores, broader-winged so tail looks shorter, soars on V-held wings, often characteristically noisy). In Philippines, both resident and migrant Eastern Honey-buzzards need to be distinguished from Philippine race of Banded Honey-buzzard [20] (long-crested, smaller, shorter-winged). In Indian region, as appropriate, consider also Short-toed Snake-eagle [67] and Bouted Eagle [230] (see under Western Honey-buzzard).

**VOICE** Normally silent, and quiet even when nesting. Various descriptions of single high-pitched screaming whistle include *pyo* (Japan) and *whereew* (India), used both from perch and in flight, as well as extensions into *whereew-ereew*, *perer-u* and *whi-zhee-who* (B&A) which may be basis for four-syllable 'wee-wey-who or weehy-weehy' (Greater Sundas). Thus, no real comparisons between different populations available.

**FOOD** Food spectrum and foraging methods of all populations probably similar to Western Honey-buzzard [18], with combs, larvae, pupae and adults of social wasps, bees and hornets preferred foods; in Japan, crickets of comparable significance, and these and other larger insects probably taken throughout range; also reptiles, frogs, small mammals, and young or injured birds. Opportunistically recorded attacking Blackbird *Turdus merula* in mist-net. In peninsular Malaysia, one observed using bill (not feet) to rip into side of arboreal nest of extremely venomous uger hornets *Vespa affinis*, which immediately attacked and completely smothered its entire head, including eyes; bird did not attempt defence and after 30 seconds dashed away, shaking off hornets as it fled, only to return 10 minutes later; after two hours, nest had been torn right through and few hornets remained.

**SOCIOSEXUAL BEHAVIOUR** Mostly singly or in pairs, but northern populations migrate in generally small groups and southern birds may also join up during 'considerable local movements depending on food supply'; what are variously described as 'numbers' or 'small flocks of eight to ten' or 'quite large parties' (sometimes of mixed sedentary and migratory populations?) also roost socially in groves of large leafy trees in India. Aerial displays not described in detail as for Western Honey-buzzard [18] but evidently comparable, including single and mutual circling and sailing, and undulating sky-dance incorporating quivering 'butterfly-like' flight on high-raised wings (unclear whether any differences between populations).

**BREEDING** June-mid September (late May-end September) in northern migratory range, mainly April-August in India, but starting February in south India and everywhere related to abundance of wasps and bees. Nest of twigs or, especially in north, leafy sprays, up to 80 cm or more across and 25 cm or more deep in Siberia, where lined with greenery, but smaller at 40-45 cm across and 20 cm deep in India (and perhaps elsewhere among sedentary forms?), where lined with dry leaves ('rarely green ones'), at 6-28 m in leafy tree (typically 10-28 m in oak, beech or conifer in north, but 6-20 m in banyan, mango, casuarina or coconut in India). Clutch usually 2 (1-3 in north, 1-2 in south). Incubation variously put at 28-35 days. Fledging 35-45 days; independence 5-8 weeks later.

**POPULATION** Generally regarded as uncommon or rare, and no national estimates, data on breeding densities, or, for the most part, concentrated migration totals like those for Western Honey-buzzard [18]. But, although Palearctic breeding range is probably less than half size of that of Western, total including sedentary southern races is almost certainly larger at around 11 million km<sup>2</sup>. In Japan, many (maximum 1,500 in one day) annually pass through northeast Kyushu from southwest Honshu in late September, and lesser numbers to mid October; geographically these seem unlikely to represent any populations other than those of Sakhalin and northern Japan - where 'uncommon' in central and northern Honshu and 'very rare' in Hokkaido (Brazil) - and those three islands together cannot account for more than c6% of the Palearctic range. (Estimates of Western Honey-buzzards for areas of corresponding size in central and northern Europe suggest that 5,000 pairs might be expected in Sakhalin and northern Japan,

which corresponds reasonably well with the Kyushu migration figures.) In Java and other Greater Sundas at the southern end of the whole range, resident long-crested races are 'sparsely distributed' and the Palearctic migrant form 'turns up as an occasional winter visitor' (MacKinnon & Phillipps), yet nearly 2,200 were counted on migration over Bali, just to the east of Java, in one month from mid October. Like its congeners, this species is inconspicuous and easily overlooked except on migration; with its total breeding area of comparable size, the suggested six-figure population may well be too conservative against the national estimates and established seven-figure population of the Western Honey-buzzard (which shows why even many European national figures must be underestimates).

**GEOGRAPHICAL VARIATION** Long considered conspecific with Western Honey-buzzard [18] but, for reasons stated there, the two seem better treated as allo-species, each extraordinarily polymorphic in patterns of head, underbody and wing-linings, but with some constant structural and plumage characters (see Confusion Species). Whereas Western is otherwise monotypic, Eastern traditionally includes one strongly migratory and five basically sedentary races.

*P. p. orientalis* (breeding Siberia to Japan, wintering Indian, Indochinese and Indonesian areas) Large, with long wings, little or no crest; very variable, as described above, but generally relatively paler than other races, often gorgeted.

*P. p. ruficollis* (Sri Lanka and mainland southeast Asia except peninsular Thailand and Malaysia) Slightly smaller, with much shorter and more rounded wings, often short crest; again very variable, but generally duller and darker above, with more rufous neck; below, often brown to rufous with blackish streaks, or barred whitish on abdomen; variably gorgeted; has all-dark melanistic morph.

*P. p. torquatus* (peninsular Thailand and Malaya, Sumatra and Borneo) Size and shape as *ruficollis*, but clear crest 60-70 mm; generally more richly coloured and more often dark, including comparable all-dark melanistic and distinct 'Tweeddale' morphs (latter mainly blackish, but with white throat and bold white barring below); throat usually white, sometimes gorgeted.

*P. p. ptilorhynchus* (endemic to Java) Longer crest than *torquatus*, up to 100 mm; apparently far less polymorphic, more uniformly rich brown.

*P. p. palawanensis* (Palawan and Calamians, west Philippines) Not unlike *torquatus*, but shorter crest, only 25-35 mm, and, though often barred below, no 'Tweeddale'.

*P. p. philippensis* (main Philippines) Size of *orientalis* and similarly crestless, but with short wings, relatively longer tail, heavier bill; paler and less barred than other sedentary races; less clearly gorgeted.

See Geographical Variation under Western Honey-buzzard for discussion of polymorphic plumage mimicry evolved to protect the relatively gentle and defenceless honey-buzzards from attack by more powerful Afrotropical hawk eagles, snake-eagles and accipiters (Edelstam & King, also p.62): the various forms of Eastern Honey-buzzard all winter in Indomalayan region, where their plumages in general, including gorget and crest, as well

as white-headed juveniles, resemble different species and age-classes of the seven southeastern Asiatic hawk eagles [237–243] of the genus *Spizaetus*. The most striking similarities are shown by the race *torquatus*, whose normal adult and juvenile plumages correspond to those of Wallace's Hawk Eagle [243], while its black and boldly barred 'Tweeddale' morph (originally named as distinct species, '*Pernis tweeddalii*') shows remarkable similarities to Blyth's Hawk Eagle [242]: both those hawk eagles share its restricted range in peninsular Malaysia, Sumatra and Borneo, where it also has a melanistic morph like that of Changeable Hawk Eagles [237] in the same regions. In this connection, it is interesting that Sulawesi's crestless Barred Honey-buzzard [20] bears a remarkable resemblance to the equally crestless Sulawesi Hawk Eagle [240]: Barred Honey-buzzard is also represented by a crested race in Philippines, where the Sulawesi Hawk Eagle is absent. There is a considerable case for treating the migratory *orientalis* as specifically distinct from the sedentary forms and then also for raising the geographically isolated *torquatus* to the species level (with *ptilorhynchus* and *palawanensis* as endemic island races), which would leave *ruficollis* and the very different *philippensis* as separate problems.

**MEASUREMENTS** *P. p. orientalis* ♂ wing 408–475 mm, ♀ 413–495 mm; ♂ tail 240–265 mm, ♀ 250–306 mm; ♂♀ tarsus 50–60 mm. *P. p. ruficollis* ♂ wing 363–417 mm, ♀ 388–445 mm; ♂ tail 245–262 mm, ♀ 250–276 mm; ♂♀ tarsus 48–60 mm. *P. p. torquatus* ♂ wing 398–000 mm, ♀ 000–455 mm; ♂♀ tail 252–273 mm. *P. p. ptilorhynchus* ♂ wing 380–390 mm, ♀ 405–418 mm; ♂♀ tail 241–263 mm, tarsus 44–49 mm. *P. p. palawanensis* ♂ wing 397 mm. *P. p. philippensis* ♂♀ wing 415–436 mm, tail 275–289 mm. **Weights** *P. p. orientalis* ♂ 750 g–1.28 kg, ♀ 950 g–1.49 kg. *P. p. ruficollis* ♀ 1.1 kg (one).

**REFERENCES** Ali & Ripley (1978), Ash (1993), Austin & Kuroda (1953), Baha El Din & Baha El Din (1997), Brazil (1991), Brazil & Hanawa (1991), Cheng Tso-hsin (1987), Cramp & Simmons (1980), Dementiev & Gladkov (1951), de Roder (1989), Dickinson *et al.* (1991), Divyabhanusinh (1990), Edelstein & King (in prep), Flint *et al.* (1984), Forsman (1994), González (1983), Grimmett *et al.* (1998), Hillecoat *et al.* (1998), Hoo *et al.* (1990), Inskipp & Inskipp (1991), Krystattas (1993), Lekagul & Round (1991), MacKinnon & Phillipps (1993), Medway & Wells (1976), Meyer de Schauensee (1984), Morioka *et al.* (1995), Parkes (1971), Prakash *et al.* (1993), Roberts (1991), Rogacheva (1992), Shirihai (1994), Smythies (1981, 1986), Stresemann (1940b), van Marle & Voous (1988), Vaurie (1965), Wells (1990), Wilkinson *et al.* (1981a/b).

## 20 BARRED HONEY-BUZZARD *Pernis celebensis* (Wallace, 1868)

Plate 10

Other name: Crested Honey-buzzard (Philippines only)

**DISTRIBUTION** Indomalayan (18.5°N to 6°S); order 5–7; generally uncommon, but widespread within limited range and locally fairly common. Endemic to Sulawesi and Philippines: known from at least four islands of Sulawesi (mainland, Peleng, Muna and Buton) and at least 13 of north, east and south Philippines (Luzon,

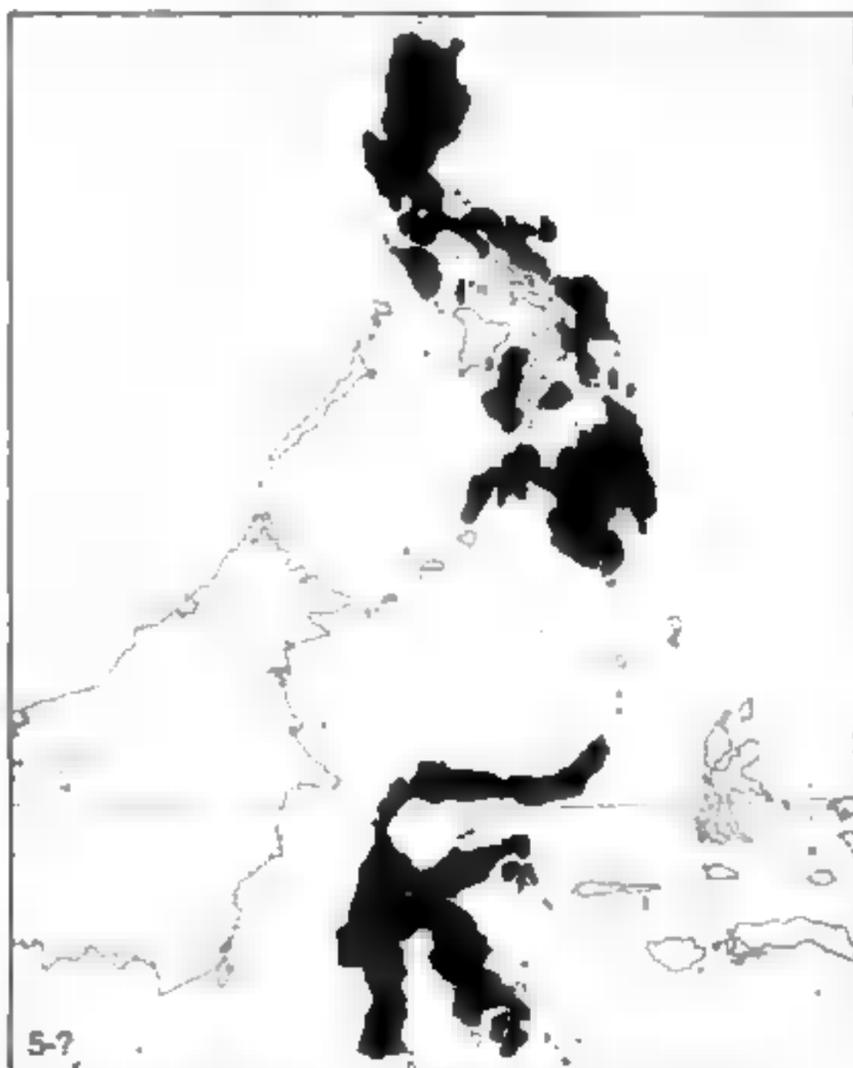
Catanduanes, Mindoro, Tablas, Masbate, Samar, Leyte, Dinagat, Siargao, Bohol, Negros, Mindanao and Basilan, but not Calamian, Palawan or Sulu Archipelago).

**MOVEMENTS** Probably fairly sedentary, though immatures may well wander.

**HABITAT** Primary forest and forest edge, especially in foothills and mountains, but also in lowlands. Mainly 250 m to 1,100 m in Sulawesi, but sea-level to 2,000+ m in Philippines.

**FIELD CHARACTERS** Largish kite, mainly brown above and both streaked and barred below, with small bill, densely feathered lores, very short (Sulawesi) or longish (Philippines) crest, short wings with noticeably short primary projection, longish tail, and short stout legs. Little known, and evidently shy. Often perches inconspicuously, but sometimes on open branches; walks on ground; wing-tips cover about one-third of tail. Sexes apparently similar (possible difference in loreal colour?) and female averages only 5% larger; juvenile distinct; probably indistinguishable from adult by second year.

**PERCHED Adult** Above, more or less dark brown with blacker crown and crest, grey lores, and otherwise blackish-streaked head and neck (all paler in Philippines; see Geographical Variation); tail pale grey-brown with pale tip, broad blackish subterminal and central bands (narrower in Philippines) and two thinner bars at base; below, Sulawesi form has black-edged white throat and buff to pale rufous chest, all sparsely blackish-streaked, above boldly sepia-barréd white abdomen, while Philippine form paler and more generally buff below with more rufous-barréd and less contrasting abdomen. **Juvenile** Shorter crest in Philippines, barely discernible in Sulawesi; pattern much as adult, but paler brown



above, edged paler still, with very light brown to buff or even whitish head and five narrow tail-bands, and paler and less clearly streaked and barred below (underbody sometimes plain white or cream in Philippines). **Bare parts** Adult eyes yellow, juvenile brown. Cere and legs yellowish to yellow.

**FLIGHT** Largish kite, with slender, well projecting head, shorter wings than other honey-buzzards (short and very rounded hands especially), and longish tail; wingspan 2.1 times total length. **Adult** More or less dark brown above, with paler head but blacker crown; tail grey-brown above, and grey below, with unequal dark banding like other adult *Pernis* honey-buzzards, in this case broad sub-terminal, fairly broad central and two narrow basal (some difference between Sulawesi and Philippines; see Geographical Variation); below, whitish to buff throat and buff to rufous chest, all sparsely blackish-streaked, and, in contrast, white abdomen and wing-linings all closely barred with brown in Sulawesi or rufous in Philippines, latter looking generally paler; undersides of flight-feathers grey, like tail, with thin, obscure and somewhat broken barring on secondaries and little suggestion of dark trailing edges, but stronger dark barring and tips on primaries. **Juvenile** Paler brown above than adult, with still paler head and edgings; five narrow tail-bands, the subterminal and its neighbour tending to be farther apart than the rest, and closer, thinner barring on undersides of flight-feathers; paler and less clearly streaked and barred below (underbody sometimes plain white or cream in Philippines), so that body and wing-linings look more uniform but for scattered black streaks on throat and chest.

**CONFUSION SPECIES** Philippine form needs to be distinguished from both resident and - especially, but not only, in northern winter - migrant races of Eastern Honey-buzzard [19], which themselves may be better regarded as two separate species; both are larger and longer-winged, with little or no crest; resident *philippensis* darker brown above, and more uniformly coloured, dark-streaked but not barred, on underbody and wing-linings; migrant *orientalis* confusingly polymorphic but very clearly longer-winged, with bolder patterns on primary coverts and flight-feathers and, if wing-linings barred, so usually is breast. Latter could also occur in Sulawesi (though not yet known to do so), but there Sulawesi Hawk Eagle [240], which Banded Honey-buzzard closely mimics in plumage and shortness of crest (p.62), is remarkably similar in pattern, though much stockier, with shorter and broader wings and fully feathered legs (may, in addition, soar on raised, not level, wings?). In Philippines, Philippine Hawk Eagle [241] not nearly so closely mimicked by local race of Banded Honey-buzzard, but crest length again corresponds.

**VOICE** Probably silent except in breeding season. Loud 'screaming' or 'ringing' calls inadequately described.

**FOOD** Like other honey-buzzards, evidently specialises on nests, larvae, pupae and perhaps adults of wasps, bees and other social hymenopterans; remains of bird found in one stomach and so, again like congeners, probably opportunist that feeds on any other available invertebrate or small vertebrate prey. Apparently perch-hunts, follows hymenopterans in flight, and also catches insects on wing, but no further details.



Fig. 24. Close similarities in plumage patterns of nominate Sulawesi race of Banded Honey-buzzard *Pernis celebensis* (left) and Sulawesi Hawk Eagle *Spizaetus lanceolatus* [240] (right). This is one of the most striking examples of the plumage mimicry that has evolved in all species of true honey-buzzard (which are relatively weak and so at risk of falling prey to larger raptors and owls), with a variety of sympatric hawk eagles and other stronger raptors as 'models' (see discussions on pages 62 and 779). In this case, the underwing and tail patterns are remarkably similar (and even total lengths and wingspans overlap) though the hawk eagle is of course stockier, broader-winged and heavier-headed, as well as having fully feathered legs.

**SOCIOSEXUAL BEHAVIOUR** Singly or in pairs. Aerial displays including high-circling and talon-grasping, but no descriptions of sky-dance.

**BREEDING** Little known. Eggs recorded in February in Philippines; and in May in Sulawesi, where female in breeding condition also shot in September. Clutch 2 (1-2?). Incubation and fledging periods unknown.

**POPULATION** Total area of the two island groups is under 0.5 million km<sup>2</sup>, and much forest habitat has been lost in Philippines in particular. Home ranges of other honey-buzzards can be as little as 10 km<sup>2</sup> or even less, and comparable area in Europe might hold up to 10,000 pairs. General impression of status in Sulawesi is that this species is widespread, and locally not uncommon; thus, despite deforestation in Philippines (where there must surely have been serious decline), it may be guessed that combined population of individuals, including first-year birds, reaches five figures. Surveys essential, however, and deforestation continuing threat.

**GEOGRAPHICAL VARIATION** Two races recognised, but geographically long isolated and sufficiently different in plumage pattern, perhaps partly because of mimicry of different endemic hawk eagles (see Confusion Species), for possibility of elevation to species status to seem worth investigation.

*P. c. celebensis* (mainland Sulawesi and some adjacent islands) Short and barely visible crest; dark brown above with broader tail-bands, white throat, buff to rufous breast, contrastingly brown-banded white abdomen.

*P. c. steerei* (Philippines) Longish crest; paler above with paler head and narrower tail-bands; buff to light rufous throat and breast, rufous-banded abdomen.

**MEASUREMENTS** *P. c. celebensis* ♂ wing 348–374 mm, ♀ 365–392 mm; ♂♀ tail 245–283 mm, tarsus 45–55 mm. **Weights** No data.

**REFERENCES** Bishop *et al.* (1994), Coates & Bishop (1997), Dickinson *et al.* (1989, 1991), Kennedy *et al.* (2000), Rand & Rabor (1960), Stresemann (1940a), White & Bruce (1986), van Bemmelen & Voous (1951).

## 21 SWALLOW-TAILED KITE *Elanoides forficatus* (Linnaeus, 1758)

Plate 14

Other name: American Swallow-tailed Kite (cf. [28])

**DISTRIBUTION** Neotropical and, now rather more marginally, Nearctic (34°N to 33°S); order 6; quite common in some parts, but decreasing in others. Southeast USA to east-central South America; breeds in coastal states of USA from South Carolina to east Louisiana (but up to 19th century much more widespread north to Minnesota and south through Texas into northeast Mexico), and from southeast Mexico (east Chiapas and south Campeche) south through most countries of Central America (mainly on Atlantic slope) and northern two-thirds of South America south to east and west Ecuador, north Peru, Bolivia, Paraguay, northwest and northeast Argentina, and north Uruguay; also still fairly common Trinidad.

**MOVEMENTS** Populations north of 10°N, including those of USA, much of Central America and Trinidad, migrate to South America between late July–September and January–March, by two routes: Texas, Mexico and mainly Atlantic side of Central America (regular passage in fairly good numbers through, for example, Costa Rica

and Panama, where species then largely absent September–early January); and Cuba and Jamaica (August–October and February–June). Southernmost populations at least south of Tropic of Capricorn similarly mainly migratory; in Ecuador, migrants thought to occur from north (both races; see Geographical Variation) and south (*yelapa*). In South America, also altitudinal movements by mountain populations (e.g. Espírito Santo, Brazil). Everywhere nomadic when not breeding. In North America, vagrants reach west to Colorado and north to south Canada (c50°N); stragglers in USA even well into October–November. In Argentina, sometimes reaches Córdoba (at least 33°S).

**HABITAT** Highly aerial, feeding above canopy along rivers and other wetland edges and around wooded clearings. Typically, open parts and edges of humid forest and adjacent cypress and mangrove swamps and marshland (absent dry regions or restricted there to streamside forest), especially in lowlands and foothills, but on migration common over temperate forest and even open country along higher slopes. Various seen over forest and forest edge, wooded patches in marshland and other open country, bushy wet savannah, and riverine woodland. Sea-level to 3,500 m, mainly 300–1,850 m, occasionally to 4,000–5,000 m over Andes.

**FIELD CHARACTERS** Largish and particularly elegant kite with small head and bill, long pointed wings, long and deeply forked tail, and short weak legs. Perches infrequently by day, and then mainly in dull or wet weather; wing-tips well down tail, giving long attenuated shape; when perched or roosting, often in parties or flocks on tall leafless trees or high dead branches; recorded sunning at roost in early morning, with wings held out, tips downward, and tail spread. Sexes similar; female averages only 3% longer-winged, but northern population 8% longer-tailed; juvenile often separable only by shorter forked tail.

**PERCHED Adult** Head and underparts white; back, wings and tail blue-black, glossed with iridescent purple, violet, green and bronze (see Geographical Variation), but becoming duller with wear. **Juvenile** Broadly similar, but shorter-tailed; black areas duller or browner-black and in northern race greener-glossed; narrow white tips to wing-coverts, flight-feathers and tail gradually wear away over first six to nine months; sometimes scattered black shaft-streaks on more buff-tinged head and breast. **Bare parts** Adult eyes red, juvenile brown. Cere dull blue-grey to green-grey. Legs blue-grey.

**FLIGHT** Medium-sized raptor with small head, long and rather narrow pointed wings, and long and deeply



forked tail dividing only just beyond tail-coverts and thus forked for more than half its length; wingspan 2.2 times total length. Flies gracefully with slow flexible beats; glides and soars on flat wings with tips upswept (or carpals sometimes depressed in glide); tail usually more or less spread, or scissored, and twisted and turned as rudder; sometimes hovers at foliage when hunting. **Adult** From above, black with white head; from below, white wing-linings, head and body (including undertail-coverts) contrast sharply with black flight-feathers and tail. **Juvenile** Similar but for clearly shorter tail; sometimes white edges show on wing-coverts.

**CONFUSION SPECIES** Could hardly be mistaken for anything other than, just possibly at long range, immature frigatebird *Fregata* (marine, twice as big, black wing-linings). White-tailed Kite [24] quite different in size, pattern and shape, including squared tail. Only other New World raptors with dark back, flight-feathers and tail and contrasting white underbody and wing-linings are light morphs of Short-tailed Hawk [191] and Swainson's Hawk [193], King Vulture [7], Darwin's Caracara [254], and Collared and Buckley's Forest-falcons [265, 266], none of which could ever cause more than momentary confusion at longest ranges with even juveniles of this delicate and graceful species.

**VOICE** Generally silent, except during display flights or other nesting contexts, especially when disturbed by human intruder, and when roosting parties gathering at dusk. Most calls shrill high repeated whistles, often rather weak with twittering or hissing quality, but sometimes more piercing or squealing and so farther-carrying; 'at times in song-like series, accelerating and slowing' (Howell & Webb). Usually two or three syllables (sometimes four or five) variously transcribed as *klee-klee-klee*, *peet-peet-peet*, *bit-dleeit-dleeit*, *ku-ku-ku* and *ku-kik-kik-kik-keee* etc. Also *kees-a-wee*, *gee-wip* and *creep* used in various contexts of alarm, inter-pair contact, change-over at nest, food-pass, and aerial chases.

**FOOD** Mainly larger flying insects, such as locusts, grasshoppers, dragonflies and beetles, but including swarming termites and ants; also frogs, small (mainly arboreal) lizards and vine snakes, wasp larvae, birds' eggs and nestlings, small birds (hummingbirds *Trochilidae*), and bat (one record); more surprisingly, fruits; perhaps small fish. All prey taken, and often eaten, on wing. Rises to considerable heights after swarming insects; congregates at grass fires. Forages by usually low transect-flights and random-quartering over canopy and marshes, or along rivers or forest edges, often below tree-top level, catching aerial insects by thrusting out one foot, or hovering and snatching caterpillars, geckos, frogs, birds and fruits mainly from canopy (sometimes from ground) and, with wasps and small birds, grabbing nests and eating contents while flying along (or may return to nest, taking one young each time); bends head down to eat from prey held in foot. Drinks on wing like swallows, just breaking surface with bill; at least one record of attempting to catch minnows. Also perches on trees or termite nests when insects swarming.

**SOCIOSEXUAL BEHAVIOUR** Social and at times highly gregarious: several pairs will nest within few hundred metres; feeding and roosting parties often of 5–30, migrating flocks frequently up to 50, and

sometimes several hundreds on passage through Panama; loose flocks separate and drift together; one pre-migration roosting assembly in Florida involved 1,300+. Migrant flocks regularly associate with Plumbeous Kites [33]. Solo or communal high-circling, mutual sailing, chases high in air or among trees, and various acrobatics, including occasional mid-air somersaults, which may combine into unsophisticated sky-dance; repeated dives from 60–90 m down to tree-top level; various forms of play, trailing vegetation; hovering and food-presentation (courtship-feeding); noisy at times.

**BREEDING** In Florida March–July, in Costa Rica January–August, in Panama and Colombia at least March onwards. Small nest of twigs, 30–60 cm across and, though some little more than flimsy platforms, usually 10–30 cm deep, lined with beard lichens, pine needles and bark strips, moss and other greenery; at 8–60 m, on very small branches and often quite exposed, in very top of tree (in Florida, often pine) that stands in clearing or at edge, or higher than surrounding canopy or, occasionally, even isolated. Clutch usually 1–2 (1–4). Incubation c28 days in USA to 31 days at Petén, Guatemala. Fledging 35–42 days, but said to average 32 days in Guatemala.

**POPULATION** In USA, two pairs on 1.6-ha island, two to three pairs in 0.3 km radius and, in 1880s, 10–12 pairs within 'several miles'. Three adults fitted with radios spent 75% of time within 132, 760 and 793 ha, but occasionally strayed up to 25–30 km. At forest site in French Guiana, estimated average density at least 10 individuals/100 km<sup>2</sup>, and, like many tropical and subtropical American raptors, distribution covers well over 12 million km<sup>2</sup>. Often considered fairly common, locally even increasing, but since it is conspicuous, and both migratory and nomadic when not nesting, small wandering parties may exaggerate abundance. Distribution also patchy: in southeast Brazil, for example, common in Paraná, but uncommon migrant in Rio Grande do Sul. Total population perhaps hundreds of thousands and, though affected by deforestation, much less threatened than some others.

**GEOGRAPHICAL VARIATION** Two races usually recognised, though validity sometimes queried.

*E. f. forficatus* (southeast USA) Blue-black above with more purplish and violet gloss; averages longer-tailed.

*E. f. yelapa* (rest of range) More green and bronze gloss; averages shorter-tailed.

**MEASUREMENTS** *E. f. forficatus* ♂ wing 418–436 mm, ♀ 436–445 mm; ♂ tail 317–343 mm, ♀ 343–370 mm; ♂ tarsus 32–34 mm. *E. f. yelapa* ♂ wing 390–427 mm, ♀ 408–447 mm; ♂ tail 275–326 mm, ♀ 298–330 mm. **Weights** *E. f. forficatus* ♂♀ 325–510 g. *E. f. yelapa* ♂♀ 390–505 g.

**REFERENCES** Belton (1984), Bensen (1992), Blake (1977), Brisse (1986–88), Buskirk & Lechner (1978), Cely (1979, 1987), Cely & Sorrow (1983, 1990), Clark & Wheeler (1987), Connor & Loftin (1983), de la Peña (1992), Fjeldså & Krabbe (1990), Gerhardt *et al.* (1990, 1991), Green *et al.* (1972), Haverschmidt (1962, 1968), Hicks (1935), Hilty & Brown (1986), Howell & Webb (1995), Kilham (1980), Lemke (1979), Lohrer & Lohrer (1984), Lohrer & Winegarner (1980), May (1935), Meyer de Schauensee & Phelps (1978), Millsap (1987), Monroe (1968), Nicholson (1928), Nugent *et al.* (1989), Olivares & Hernandez (1962), Olrog (1985), Palmer (1988),

Parker (1984), Phelps (1914), Ridgely & Gwynne (1989), Salaman (1993), Sick (1993), Skutch (1950, 1954, 1965, 1981), Slud (1964), Snyder (1975), Stephanie (1953), Stiles & Skutch

(1989), Sutton (1955), Terborgh & Weske (1975), Thiollay (1989a/b, 1991a), Voous (1969), Wayne (1910), Wiley (1985), Wright & Harper (1913).

## Accipitridae (b: Bat-hawk)

### 22 BAT-HAWK

*Macheiramphus alcinus* Bonaparte, 1850

Plate 8

Other names: Bat Kite, Bat Fern, Bat Falcon, Bat-eating Hawk, Bat-eating Buzzard

**DISTRIBUTION** Afro-Malagasy, Indomalayan and, marginally, north Australasian (15°N to 31°S); order 5?; widespread, with fragmented distribution, but local and, for the most part, at best uncommon and often rare, though scarcity may be exaggerated by crepuscular behaviour. Africa, southeast Asia and New Guinea: much of sub-Saharan Africa from Senegal, Nigeria, Cameroon, northern Congo and Kenya, also central Ethiopia, southwards to northernmost Namibia, Zimbabwe and eastern South Africa; Madagascar (no breeding records); south Tenasserim, peninsular Thailand and Malaysia, Sumatra, Borneo, and north-central Sulawesi (no breeding records); and southeastern New Guinea.

**MOVEMENTS** Generally considered sedentary, but sudden appearances in southwest Madagascar during southern 'winter' suggest some migratory movement, and often turns up well outside usual habitats in subtropical southern Africa; apparently also visitor to parts of northeast tropical Africa.

**HABITAT** Forest, woodland, wooded hills, partly cleared or disturbed forest and gallery forest, less often dry bush country and locally even town squares, hunting over open areas in vicinity of caves, old mine-workings, rivers, lakes, tidal creeks, human habitations, street lighting and station platforms; anywhere where bats and other flying prey occur in numbers at dusk. Sea-level to 2,000 m.

**FIELD CHARACTERS** Mid-sized, almost entirely crepuscular kite, as adult dark with variably limited white below (sometimes completely concealed), though juvenile more extensively white, with somewhat falcon-like shape produced by long pointed wings, medium-shortish tail; small weak bill, but huge gape that extends back beneath prominent yellow eyes made to look even larger by white surrounds; small head, pointed crest of variable length, unusually long middle toes. By day, perches very upright at forest edge or clearings, either in canopy shade or in open on dead branch, or frequently in nest even out of breeding season; remains hunched, often on one leg, with one or both eyes almost or completely closed (white eyelids and, where present, two nape-spots perhaps look sufficiently like eyes to discourage predators when asleep); wing-tips near tail-tip (except on longer-tailed juvenile). Polymorphic. Sexes similar, but female 6% larger; juvenile distinct.

**PERCHED Adult** Sooty-brown to brown-black with white upper and lower 'eyelids' and, typically, white throat bisected by black gular stripe but, both individually and racially, amount of white on head and underparts varies considerably: some have all-brown throat, others white hind-collar or false nuchal 'eyes' and white chest, belly-patch or, possibly, largely white underparts with brown blotches and clearer tail-barring (see Geographical Variation). (The last may represent second-year stage that follows juvenile, but in that case it is surprising that wing-linings, unlike juvenile's, are also mottled brown



and white.) **Juvenile** Much like adult above, apart from some whitish mottling produced by pale feather-bases; mainly white below, with broad band of mottled brown across lower breast. **Bare parts** Adult eyes yellow, juvenile brown at first. Cere blue-grey. Legs bluish-white.

**FLIGHT** Like large falcon in general proportions, with long broad wings slightly blunt-tipped, but bend of wrists noticeably pointed (carpal protrusions almost suggestive of bat's thumbs) and tail shortish and square-ended, also head slenderer with eyes larger and bill smaller; wingspan 2.3 times total length. Except during aerial displays in breeding season (see Sociosexual Behaviour) seldom seen flying by day, though in both New Guinea and South Africa occasionally leaves perch and flies around above forest, soaring in heat or chasing intruders from nest area. Cruising flight leisurely and graceful with rather slow, pronounced, kite-like beats, alternated with glides, but in pursuit fast, falcon-like. **Adult** Looks all dark, even in daylight – apart from, usually, some white showing on throat and variably elsewhere (see below) – though African birds in fact also have indistinctly paler-barred tail and spotted primaries. **Juvenile** White below with dark breast-band and slightly clearer tail-bars.

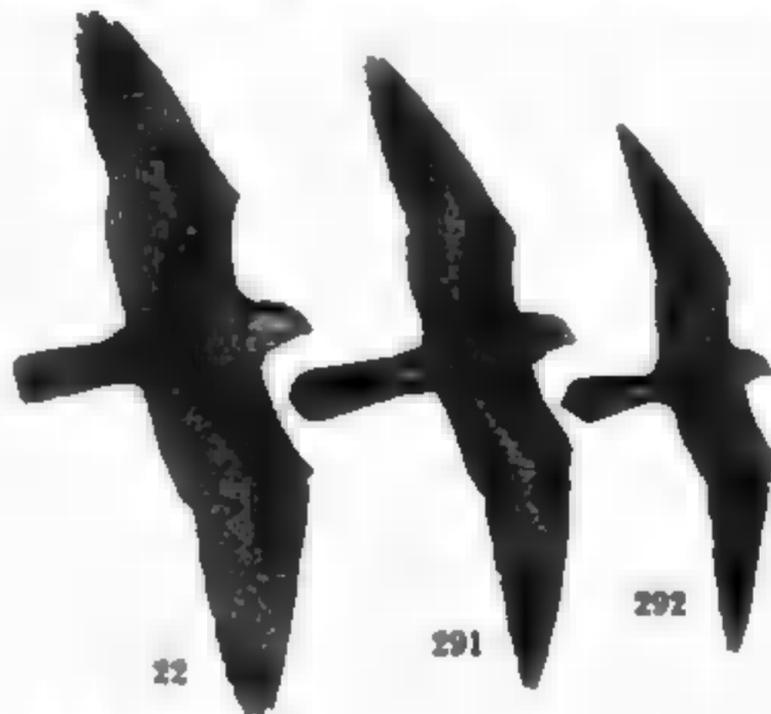


Fig. 25. Proportions of Bat-hawk *Macheiramphus olivaceus* (left) compared with those of two dark falcons that are similarly crepuscular, and sympatric with it in Madagascar and some regions of southeastern Africa during October-May. Apart from varying amounts of white on throat and elsewhere (sometimes concealed), it is distinguished in flight from dark morph of Eleonora's Falcon *Falco eleonorae* [291] and Sooty Falcon *F. concolor* [292] by its larger size, broader and blunter-tipped wings – with clearly protruding carpal joints – and shorter square-ended tail. Size and proportions are thus closer to Lanner [305] or Peregrine [309].

**CONFUSION SPECIES** Since it perches very upright, some possibility of being mistaken at long range in Africa for dark Wahlberg's Eagle [229]. Normally, however, only real risk of confusion is with larger falcons (or sometimes even accipiters flying in poor light) – such as Peregrine [309]; in Africa, Lanner [305]; and in eastern Africa and Madagascar, because they are also blackish and similarly crepuscular, Sooty Falcon [292] and dark morph of Eleonora's [291] (see text figure), particularly as latter also has leisurely foraging flight with slow beats. These last two falcons are, however, clearly smaller and relatively larger-headed, with different feeding behaviour:

though recorded taking bats, both are primarily insectivorous in winter quarters; if either caught a bat, it would not be able to swallow it in flight. In New Guinea, only other blackish raptors of anywhere near comparable size are assortment of dark morphs of dimorphic or polymorphic species: Brown Falcon [274] (smaller, with obscure moustaches, two-tone underwings, pale-barred flight-feathers); males of Bürger's Hawk [155] (dark morph very rare) and Meyer's Goshawk [154] (females of both much larger), and females of Pied Goshawk [124] and Varied Goshawk [121] (both smaller – their males smaller still – and all four of these *accipitrines* have shorter rounded wings with two-tone pattern below and longer, more or less rounded tails – see text-figure on p.543); and, finally, New Guinea race of Little Eagle [251] (dark morph rare, not uniformly dark above or below, and again different proportions).

**VOICE** Generally silent away from nest area. Except for weak but falcon-like chatter of alarm, *kek-kek-kek...*, calls are rather quiet and apparently used mostly in displays or in contact between pair-members at dusk: high-pitched *kwik-kwik-kwik-kwik*, or repeated fast *kwirp*, higher-pitched from male, increased just before hunt; soft musical *chuk-chuk-chuk* and mellow *woot-woot-woot*, this perhaps same as or similar to fast *quit* or *qohuit*, first part whistled and second part rising, given against intruders or mobbing birds. In New Guinea sometimes noisy, particularly in early daylight, late afternoon and courtship: usual call a series of normally five *ker* notes of typical hawk quality.

**FOOD** Mainly small bats, or in Malaysia and Indonesia cave-nesting swiftlets *Aerodramus/Collocalia*, that can be swallowed in flight; also some other birds, and large flying insects. Bats mostly in range 20–75 g; bigger bats rarely attacked and usually ignored. Even in Africa, up to 70% of pellets found to contain some bird remains: these often aerial and dusk feeders of same habitats as bats, especially hirundines, swifts (*Apodidae*) and nightjars (*Caprimulgidae*), but have included various passerines and others up to the size of Emerald Cuckoo *Chrysococcyx cupreus* and smaller doves (*Columbidae*). Becomes alert at sunset and preens for 20–30 minutes before setting off to hunt: in Africa, most bat prey caught in 15–30 minutes at dusk, much less at dawn or by moonlight, but some hunting continues at night where bats feeding on insects near artificial lights. Sometimes still-hunts, flying out from perch, but usually patrols open area where bats emerging from roost or beginning to feed often over river, dam or other open water. When prey selected, accelerates rapidly, twisting and turning, then grasps it from behind and usually from above, quickly transferring it from talons to bill and generally swallowing it whole in 3–8 seconds; birds taken in same manner, but occasionally larger bats and birds may be carried to perch. Many bats caught are dropped, perhaps because they are too large or manage to bite the Bat-hawk's foot. Time between successful captures 1–4 minutes; 4–11 bats caught each evening (average seven), but on occasion even up to 17 (total daily requirement). Some individuals more opportunist feeders, taking solitary birds or bats.

**SOCIOSEXUAL BEHAVIOUR** Usually seen singly, occasionally pair together. Unless bird disturbed from its perch, diurnal activity largely confined to aerial

displays associated with breeding: accompanied by high-pitched calls, these involve single or mutual low-circling at tree-top level or lower, female sometimes flipping over and talon-touching as the two pass, also aerial chases, tumbling and rolling acrobatics, and diving down into nest-tree, male sometimes performing almost vertical dive from c300 m. Sometimes female may break stick from tree in passing, carrying it in talons and nibbling at it, both flying and perched, before dropping it; male also performs ritual stick-collecting, but quickly loses stick(s).

**BREEDING** March–June and October–January in West Africa; peak September–December in southern Africa; mostly April–August in East Africa; April–September in Malaysia and Sumatra. Substantial stick nest, 50–100 cm across and 30–50 cm deep, lined with finer twigs and at least sometimes green leaves, on outer lateral branch or upright fork at 10–60 m, usually in large, emergent, pale-barked tree (such as eucalyptus or baobab), which is presumably more visible at night; some nests even in town trees. Clutch 1 (1–2). Incubation up to 48 days, and fledging at up to 67 days, both unusually prolonged.

**POPULATION** Because this species generally considered rare and very local, probably with mostly low densities, its world population might seem unlikely to exceed the higher thousands. But an average of only 1 pair/2,000 km<sup>2</sup> over the wide distribution of more than 10 million km<sup>2</sup> would give five-figure total, and in South Africa, where this species considered rarer than in the tropics, home range of c450 km<sup>2</sup> has been calculated. Moreover, because it is crepuscular and even nocturnal, and by day often roosts within dense foliage, it is also easily

overlooked. It is probably in no danger where woodland bases remain and small bats (or cave swiftlets) plentiful. Since some individuals are opportunistic, may be able to survive in areas other than those with good bat roosts.

**GEOGRAPHICAL VARIATION** Three races.

*M. a. alcinus* (peninsular Thailand and Malaysia, Sumatra, Borneo) Largest, darkest form, with white throat-sides and chest, plain tail.

*M. a. papuanus* (southeast New Guinea) Smaller, less crested, with white nuchal collar, more white on abdomen.

*M. a. anderssoni* (sub-Saharan Africa, Madagascar) Smallest form, amount of white below more variable, even dimorphic; tail and primaries obscurely barred.

**MEASUREMENTS** *M. a. alcinus* ♂♀ wing 371–412 mm, tail 171–177 mm, tarsus 58–62 mm. *M. a. papuanus* ♂♀ wing 338–378 mm, tail 162–186 mm. *M. a. anderssoni* ♂ wing 324–338 mm, ♀ 336–360 mm; ♂♀ tail 166–184 mm, tarsus 58–62 mm. **Weights** 600–650 g.

**REFERENCES** Auburn (1987), Ballance (1981), Bartels (1952), Beehler *et al.* (1986), Black *et al.* (1979), Benson & Benson (1975), Britton (1980), Brooke & Clancey (1981), Brown *et al.* (1982), Chapin (1932), Coates (1985), Colebrook-Robjent (1971), Dagnan (1960), Eastwood (1994), Eccles *et al.* (1969), Fenton *et al.* (1977), Finch (1978), Gynn (1995), Harris *et al.* (1990), Hartley & Hustler (1993), Hustler (1983b), Kemp & Kemp (1975c, 1998), Langrand (1990), Lewis & Pomeroy (1989), Maclean (1993), Madox (1976), Mayr (1940), Medway & Wells (1976), Meyburg & van Balen (1994), Milton *et al.* (1973), Milstein *et al.* (1975), Pickford *et al.* (1980), Pinto & Pinto (1983), Smythies (1981), Steyn (1982), Tarboton & Allan (1984), Thomson (1975), Vernon (1979).

## Accipitridae (c: white-tailed kites)

### 23 PEARL KITE

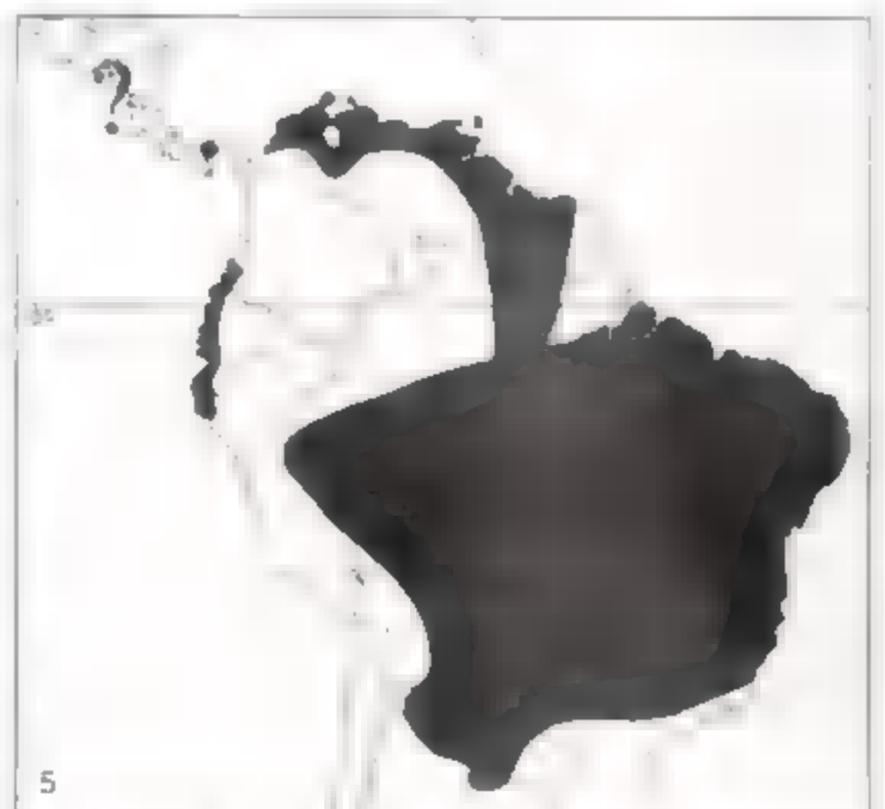
*Gampsonyx swainsonii* Vigors, 1825

Plate 14

**DISTRIBUTION** Neotropical (13°N to 28°S); order 5; locally fairly common, and increasing through deforestation. Central America and mainly tropical South America: west Nicaragua (isolated population); southwest Ecuador and northwest Peru (another long isolated population, sometimes stated to extend to coastal southwest Colombia); main range from east Panama (first recorded 1977, subsequently more widespread in eastern half) and north Colombia (south to Cundinamarca-Tolima boundary), through Venezuela and Guianas (where formerly regarded as straggler), southwards east of Andes in suitable areas of Brazil, east Ecuador (recently and increasing), eastern Peru and Bolivia, Paraguay, northern Argentina and perhaps north Uruguay; also Trinidad and Isla de Margarita (Venezuela).

**MOVEMENTS** Sedentary, or locally nomadic.

**HABITAT** Palm and other sparsely wooded savannah, dry open tableland with tangled vegetation of coarse grass and stunted trees (cerrado), and arid scrub by rivers, but also penetrating to urban 'parkland' (open parts of towns with some trees) and particularly now to partially felled areas and natural clearings in both dry and more humid forest; also gallery forest in northern Argentina. Sea-level to 1,000+ m.



**FIELD CHARACTERS** Tiny kite, more like shrike (Laniidae) or African Pygmy-falcon [267] in proportions, with short powerful bill, pointed wings, squarish-tipped tail, and relatively strong legs and feet (tarsus

length comparable to that of Swallow-tailed Kite [21], which is two to three times the size). Quite confiding; perches conspicuously, often flicking tail, on tops or bare side twigs and branches of bushes or trees, or on wires, telegraph poles and fence posts; inside canopy only in heat of day; wing-tips extend well down tail, but clearly short of tip. Sexes similar and some overlap in size, but largest females 10–20% bigger than smallest males; juvenile also rather similar, but easily distinguished.

**PERCHED Adult** Basically slaty-black above and white below, but made colourful by creamy-yellow to orange-tinged forehead and cheeks, narrow white (usually inconspicuous) and broader chestnut hind-collar extending into black or chestnut at chest-sides, white-tipped flight-feathers, rufous thighs and (from Amazon northwards) variably chestnut flanks. **Juvenile** Broadly similar, but browner above, edged buff to rufous on upperbody and shoulders (and, in fresh plumage, larger white tips on greater coverts as well as remiges), with duller crown, broader pale hind-collar, and more rufous underbody. **Bare parts** Adult eyes dull red to clear red, juvenile browner. Cere blue-grey. Legs yellow.

**FLIGHT** Very small raptor with longish thin pointed wings, and square-tipped tail only slightly rounded at corners; wingspan 2.2 times total length. Dashing falcon-like action, usually quite low down, but will also soar to great heights; glides on flat or very slightly raised wings; hovers briefly. **Adult** From above or behind, largely black with bold white trailing edge to wings (less prominent in worn plumage), also pale forehead and inconspicuous collar; from below, entirely pale (white body, cream wing-linings, slightly rufous thighs or flanks, palest grey flight-feathers and tail) unless patches at chest-sides visible. **Juvenile** Browner above with pale edgings and more obvious hind-collar; more pale rufous on underbody.

**CONFUSION SPECIES** Almost unmistakable but, seen briefly from passing car, can be dismissed as American Kestrel [276], which is of comparable size, shape and behaviour, though with relatively longer wings and tail (quite different pattern includes black moustaches and cheek-lines, rufous and more or less barred back and tail, variably blue-grey shoulders, and spotted or streaked underparts).

**VOICE** Usually silent. High-pitched scolding *kitt-y, kitt-y, kitt-y...* and *kit-kit-kit, ts-ew, ew, ew, ew*. Also low *ker-ker...*

**FOOD** Insects; geckos and other small lizards; probably only rarely small birds. Chiefly still-hunts from conspicuous perch, dashing out or down to snatch prey. Also forages in low flight, sometimes hovering before pouncing.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in

pairs. Only aerial display described involved high-circling with much flapping and frequent scolding calls (see Voice).

**BREEDING** Eggs recorded in Colombia end November and downy young in Venezuela mid April, also birds in breeding condition in April–May; possibly no fixed season at lower latitudes. Small nest of loose twigs, c20 cm across and 10–12 cm deep, 4–7 m up in tree (one at tip of horizontal branch of scrub-oak resembled that of mockingbird *Mimus*), but in Trinidad c5 m from top of 25 m tree. Clutch 2–3 (2–4). Incubation period not recorded. Fledging c35 days. Occasionally double-brooded in Trinidad, possibly also Colombia and Venezuela.

**POPULATION** Fairly common to locally numerous, and extending in both range and numbers. Deforestation in north Colombia provided suitable habitat and a population increase that led to spread into Panama (which, if it continues, could eventually link to Nicaragua's isolated group 800 km away). Total range at present probably under 8 million km<sup>2</sup>, perhaps well under, and extent of spread into damaged parts of Amazonia unrecorded, but population seems likely to be of at least five figures. Easily overlooked because of small size; increasingly adaptable, and shrike-like in behaviour, this species seems set to continue doing well for reasons similar to those affecting the more conspicuous White-tailed Kite [24]. Misuse of pesticides could be only problem.

**GEOGRAPHICAL VARIATION** Three races.

*G. s. swainsonii* (South America south of Amazon) Adult lacks rufous on flanks.

*G. s. leonae* (Nicaragua, Panama, Colombia and South America north of Amazon) Adult has some rufous on flanks.

*G. s. magnus* (coastal southwest Ecuador and northwest Peru, possibly north to southwest Colombia and perhaps farther inland in north Peru) Like *leonae* but larger.

**MEASUREMENTS** *G. s. swainsonii* ♂ wing 141–159 mm, ♀ 138–160 mm; ♂ tail 82–95 mm, ♀ 92–100 mm; ♂♀ tarsus 28–32 mm. *G. s. leonae* ♂ wing 141–154 mm, ♀ 150–163 mm; ♂ tail 94–98 mm, ♀ 95–102 mm. *G. s. magnus* ♂ wing 163–177 mm, ♀ 172–178 mm; ♂ tail 98–108 mm, ♀ 100–115 mm. **Weights** *G. s. leonae* ♂ 94 g (one).

**REFERENCES** Blake (1977), Belton (1984), Canevati *et al.* (1991), Contreras *et al.* (1990), de la Peña (1992), French (1973, 1982, 1985, 1992), Friedmann & Smith (1953), Haverschmit (1968), Hilty & Brown (1986), Meyer de Schauensee & Phelps (1978), Olrog (1985), Pinto (1964), Pujals *et al.* (1977), Ridgely & Gwynne (1989), Robbins *et al.* (1985), Salaman (1993), Sick (1993), Skutch (1965), Snyder (1974), Stresemann V (1959), Thiollay (1991), Wiley (1985).

## 24 WHITE-TAILED KITE *Elanus leucurus* (Vieillot, 1818)

Plate 12

Other name: American Black-shouldered Kite

**DISTRIBUTION** Nearctic and Neotropical (43°N to 43°S); order 6; fluctuating but locally common and, after earlier declines in northern range, generally increasing since 1950s–70s and spreading almost throughout.

Western and southern USA through Central America and much of South America; locally in western and southeastern USA (western Oregon and California, south Arizona and New Mexico and, in east, rare in South Carolina, Florida and south Oklahoma, more numerous in coastal Mississippi, Louisiana and Texas);

down through much of Mexico (northwest Baja California and from southern Sonora, north and central Chihuahua and Tamaulipas to Chiapas and Yucatan Peninsula in east) and, particularly since 1960s, most countries of Central America; and in much of South America north and south of Amazonia, from northern and eastern Colombia down into northeast Ecuador (greatly increasing since 1970) and through Venezuela to Guyana, Surinam and north Brazil; also eastern and southern Brazil (common, increasing, and spreading) down through east Bolivia, Paraguay, Uruguay and much of northern two-thirds of Argentina (south to Chubut) and Chile (Valdivia); now uncommon resident Trinidad, where formerly vagrant.

**MOVEMENTS** Mainly sedentary or nomadic, depending on rodent populations, though some evidence of regular south-north movements in austral spring and autumn of more southerly Chilean and Argentine populations. Wanders widely in USA north to Nebraska, Wisconsin and Minnesota and southwards in Chile and Argentina; such wanderers enable newly deforested areas to be colonised quickly. In Argentine wheat belt (Buenos Aires province), numbers very variable from year to year, presumably reflecting rodent cycles.



**HABITAT** Ranches with shelterbelts, other grassland and marshes with scattered trees; sparsely wooded savannah and thin scrub, riverine strips; also, increasingly, poor pastures and brush where forest newly cleared, and green areas of towns and cities (even Rio de Janeiro). Mostly sea-level to 1,500 m, mainly below 1,000 m, but locally wanders to 2,600 m and one record at 4,200 m in Peru.

**FIELD CHARACTERS** Smallish white-and-grey falcon-like kite (often appearing all white at distance) with small bill, broad head, rather long wings, shortish tail, and short legs. Frequently crepuscular. Perches conspicuously on tree tops, bare branches, and telegraph poles or wires; wing-tips extend well down tail, but tail short

of tip. (Normally does not repeatedly raise and lower tail like Black-shouldered Kite [25] of Old World.) Sexes similar in plumage and size, but female slightly darker and averages slightly larger; juvenile separable only until first moult at four to six months.

**PERCHED Adult** Predominantly grey above and white below, apart from black shoulders (lesser and median coverts) and small black eye-patches; crown and nape paler than back, forehead and face white, tail pale grey (white sides when not closed); male paler on back than female. **Juvenile** Broadly similar, but clearly browner and less uniform above; brown, slate and white streaks on crown and nape; variously prominent buff and whitish edges on darker grey-brown back and black shoulders, and white tips to greyer leathers of rest of wings; tail dusky near end; face and underbody white, but cinnamon wash and rufous specks on breast when first fledged. **Bare parts** Adult eyes orange-red, juvenile pale brown, turning yellow-brown and later orange. Cere and legs yellow.

**FLIGHT** Fairly small raptor with well protruding head, long and quite broad pointed wings, and shortish squared tail (very slightly forked when closed); wingspan 2.5 times total length. Flies with light steady beats of angled wings; glides with arms raised, long hands flat and angled back; soars with wings raised and held forward, tips slightly rounded; frequently hovers, often persisting for minutes on end, with shallow beats of raised and outstretched wings, body slanted, tail spread, legs sometimes dangling with feet closed. **Adult** Looks very pale; mainly grey above, with whiter head and white tail-sides, but for black inner forewings and small black eye-patches; and all white below except for greyer secondaries, blackish wing-tips and conspicuous black carpal oblongs. **Juvenile** Darker and browner above with pale edges and tips, streaky head, less clear-cut black shoulders, and dusky subterminal tail-band; more like adult below, except for tail-band and variable band of rufous and darker red-brown specks on breast and flanks.

**CONFUSION SPECIES** Adult easily identified by colour and contrasting black shoulders; also by combination of shape, flight action and frequent hovering, which apply to juveniles, too. On quick view, flies more likely to be dismissed as gull or, when hovering at dusk, as Barn Owl *Tyto alba*. Only other mainly grey-and-white raptors of open country in same range are males of Northern Harrier [94] (North and Central America) and Cinnereous Harrier [95] (South America), which also glide on raised wings (most markedly when hunting), but both are larger, with all-grey head, white rump (not always obvious), dusky trailing edges to underwings instead of carpal oblongs, and no black shoulders, also different proportions and foraging behaviour. Mississippi Kite [34], which moves to South America in northern winter, and closely related but rather darker Plumbeous Kite [33] both have a dark tail (plain or thinly banded), and are darker-bodied as adults and more heavily streaked below as juveniles. Regular hovering recalls American Kestrel [276], but pattern quite different and all falcons lack the plain white undertail and dark carpal marks.

**VOICE** Generally silent except when breeding. Various calls have weak whistling, wheezing, piping or chirping quality. Whistled or chirped *keep* used as contact by both

sexes. Disyllabic *ee-grack*, first part whistled and second guttural and raspy, used variously in alarm, food-transfer, copulation and at other times of excitement.

**FOOD** Chiefly mice and other small rodents to size of cane-rats *Hodochilus* and cotton-rats *Sigmodon*, also small opossums, shrews (northern South America northwards), and voles (USA); large insects; some small birds, reptiles and amphibians. Forages mainly at 10–30 m by transect-hunting or quartering with slow beats or faster gliding, then hovering repeatedly before pouncing with dangling legs and upstretched wings. Occasionally drops on to prey from perch, but this probably opportunism rather than regular still-hunting. Most prey caught on ground, some insects and small birds chased in flight; small items may be eaten in flight. Often hunts at dawn and dusk.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or often in pairs, but numbers may concentrate at abundant food sources and, outside breeding season, communal roosts of several tens or even hundreds may occur; when population high, may nest semi-socially, with several pairs inside few hundred metres. Aerial displays include single and mutual high-circling, butterfly-flapping, and chases; talon-grappling recorded; aerial food-pass regular. Male also rapidly flutters V wings with tail closed, feet sometimes dangling, and much calling, in what appears to be symbolisation of hover-hunting. Early in breeding season, male spends much time on one regular exposed perch.

**BREEDING** March–August in USA but January onwards in California, and November onwards in Nuevo León, Mexico, December–June in Panama, February–July in northwest South America, October–July in Surinam, late August–December in southern Brazil, September–March in Argentina, from September in Chile. Small flat nest of twigs, 30–50 cm across and 10–20 cm deep, lined with grass and other finer vegetable matter, in top of small or tall tree in open; occasionally uses other species' old nests, which normally rebuilds. Clutch 3–5 (2–6). Incubation 30–32 days. Fledging c35–40 days. Sometimes double-brooded.

**POPULATION** Total breeding distribution encloses over 9 million km<sup>2</sup>, and densities may vary from 1 pair/100 km<sup>2</sup> (or much less) to 1 pair/1 km<sup>2</sup> (or rather more). Generally increasing. Nearly extinct in North America before 1930, but has reoccupied and even exceeded original range following expansion that began in 1940s and accelerated in 1950s and 1960s; has spread rapidly

in Central America since early 1970s; and has been colonising newly deforested areas in South America since late 1950s. As examples, numbers in California grew from handful in 1940s to 1,400+ by 1975; and in Panama, where first recorded only in 1967, breeding by 1970, 'fairly common to common' by mid 1980s. Population in hundreds of thousands may seem conservative, but fluctuations do give exaggeratedly high impressions at peak times. Pesticides probably only likely threat.

**GEOGRAPHICAL VARIATION** Two races.

*E. l. leucurus* (South America, north at least into Panama) As above.

*E. l. majusculus* (USA and Mexico, south to Costa Rica?) Averages slightly larger and longer-tailed.

Sometimes treated as conspecific with Old World and Australian Black-shouldered Kites [25, 26], but these three best regarded as allospecies forming a super-species: apart from being largest, White-tailed has proportionately longer tail and small but significant differences in plumage, behaviour and voice.

**MEASUREMENTS** *E. l. leucurus* ♂ wing 290–308 mm, tail 151–175 mm, tarsus 33–37 mm. *E. l. majusculus* ♂ wing 302–328 mm, tail 174–186 mm, tarsus 36–39 mm.

**Weights** *E. l. leucurus* ♂ 250–297 g (two), ♀ 307 g (one). *E. l. majusculus* ♂ 305–322 g (three), ♀ 332–375 g (five).

**REFERENCES** Belton (1984), Blake (1977), Bolander & Arnold (1965), Bond (1940), Canesari *et al.* (1991), Clark & Banks (1992), Clark & Wheeler (1987, 1989), Contreras *et al.* (1990), Cunningham (1955), de la Peña (1992), Dixon *et al.* (1957), Eisenmann (1971), Ellis & Monson (1979), French (1985, 1992), Fjeldså & Krabbe (1990), Fraga (1984), Gallardo (1986), Greer & Bullock (1966), Haverschmit (1959a, 1962, 1968), Hawbecker (1940, 1942), Henry & Anear (1978), Hilty & Brown (1986), House (1935), Howell & Webb (1995), Husain (1959), Jaksic & Delibes (1986, 1987), Jaksic *et al.* (1981, 1987), Johnson (1965), Kale (1978), Kaplan *et al.* (1980), Larson (1980), Lewis (1980), Mendelsohn & Jaksic (1989), Meserve (1977), Meyer de Schauensee & Phelps (1978), Miles (1964), Montiel de la Garza (1978), Moore & Barr (1941), Morgan (1948), Narisky & Yzurieta (1989), Norev & Yzurieta (1981), Olmes (1976), Olrog (1979, 1985), Orians & Paulson (1969), Palmer (1988), Parke (1958), Peyton (1915), Pickwell (1930, 1932), Prueti-Jones *et al.* (1980), Remsen & Ridgely (1980), Ridgely & Gwynne (1989), Schlatter *et al.* (1980), Sick (1993), Stiles & Skutch (1989), Stendell & Myers (1973), Thiollay (1980b, 1991a), Thompson (1975), Thurber & Serrana (1972), Voous (1969), Waian & Stendell (1970), Warner & Rudd (1975), Watson (1940), Wheeler & Clark (1995).

## 25 BLACK-SHOULDERED KITE

*Elanus caeruleus* (Desfontaines, 1789)

Plate 7

Other names: Black-winged Kite, Blue Kite, Common Black-shouldered Kite (as distinction from Australian)

**DISTRIBUTION** Typically Afrotropical and Indomalayan, much more marginally West Palearctic and north Australasian (44°N to 35°S); order 7; widespread, but varies from rare and local to very common, even abundant. Southwest Europe, Africa, south Asia to New Guinea; main range through much of sub-Saharan Africa (especially east and south, but in many other non-forested parts from Senegambia across to Ethiopia and

down to Cape Province) with extension into southwest Arabia (Yemen and Oman to Masirah Island), and in Indomalayan Asia south from Himalayas and southeast China (including Pakistan and Indian subcontinent down to Laccadives and Sri Lanka, east through Bangladesh, Burma and Thailand to Indochina and Malay Peninsula), on through Sumatra, Java, Borneo, Sulawesi, Philippines and various of Lesser Sundas and Moluccas to New Guinea; in Palearctic, isolated pockets in northwest Africa (west and north Morocco, coastal Algeria)



and declining numbers in northeast Africa (Nile valley down through Egypt), but now significant population in southwest Europe (south Portugal, west and north Spain, southwest France); apparent increase and spread in Iberia has coincided with decline in northwest Africa.

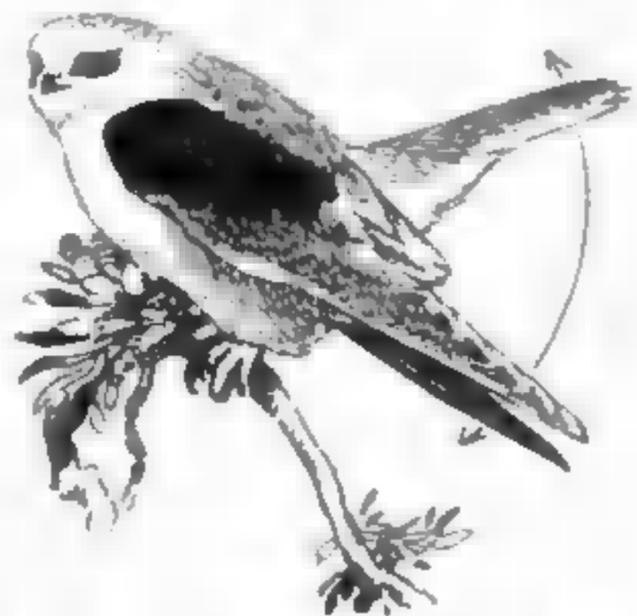
**MOVEMENTS** Typically sedentary, though juveniles dispersive, but in tropical regions often nomadic, seasonally migratory, even eruptive: in West and other parts of tropical Africa, seasonal movements related to rains, but more nomadic in East and South Africa in response to prey populations, and thus extended at times to eruptive behaviour both there and in India; various recoveries from ringing in Transvaal involved distances of 300–900+ km. Vagrant south and central Europe north to Netherlands, and Turkey, Lebanon, Israel, Uzbekistan and northeast China (south of Beijing).

**HABITAT** Open savannah, other grassland and cultivation with scattered trees, but also wide variety of fringe habitats, ranging from forest edge, riverine galleries, and large clearings in open woodland – often quickly taking advantage of recent deforestation – to semi-desert thornbush and even pure desert with rocky outcrops. Sea-level to c.750 m in West Palearctic, to 2,000 m in south Asia and Sundas, and to 3,000 m in Africa.

**FIELD CHARACTERS** Small falcon-like kite, grey, white and black-shouldered, with small wide-based bill, large head and eyes giving owl-like look, long pointed wings, short and slightly notched tail, and short legs and sturdy feet. Sometimes unobtrusive in canopies, particularly in heat of day in tropics, but also often perches openly on tree top or side branch, telegraph pole or wire, frequently cocking and, more slowly, lowering tail; short legs hardly show, wing-tips extend well beyond tail. Sexes similar, and little size difference, with female only c.3% larger and perhaps 19% heavier; juvenile distinct; as adult after completion of first moult (begins at three

months in West Palearctic, even earlier or considerably later in southern Africa).

**PERCHED Adult** Mainly pale grey above and white below – at distance in sunlight can look almost all white – apart from bold black shoulders (lesser and median coverts), and blackish-edged red eyes in largely white face. **Newly fledged juvenile** Pattern broadly similar, but much browner-looking, duller, and initially obscured or speckled by brown and whitish fringes: basically grey-brown above, with dusky streaks on crown, brownish edges to upper mantle and shoulders (shoulder-patches thus browner-black and stand out less), whitish fringes to rest of upperbody and white tips to greater coverts and flight-feathers (two white lines across closed wings) as well as tail; and dull white below, with dark shaft-streaks on breast, flanks and forepart of belly overlaid by rusty-buff wash on, especially, much of head and chest. **Older juvenile** With fading and abrasion, rusty wash on head



**Fig. 26.** When perched, Black-shouldered Kite *Elaanus caeruleus* of either sex will sometimes repeatedly cock and, more slowly, lower the tail, with wings slightly drooped.

and chest disappears within weeks, leaving only some dusky streaking, while mantle bleaches to dull brownish and white tips on rest of upperbody gradually wear off. **Transitional first-year** Early post-juvenile body moult begins at age of only three months in West Palearctic, and in southern Africa even earlier among juveniles hatched from spring eggs, which immediately after fledging begin a slow body moult extending over several months; in contrast, those hatched in southern Africa from autumn eggs undergo complete and more rapid moult at c8–10 months. After body moult, much more like adult, but, until completion of wing and tail moult, separable on close views by white tips to retained juvenile greater coverts and flight-feathers, and by duller browner-black shoulders; also by no more than slightly darker grey arc on primary coverts and by greyer juvenile tail with dusky subterminal band, though these latter features more significant in flight (see 'Flight'). **Bare parts** Adult eyes deep red; juvenile greenish-grey at first, soon changing through brownish-yellow to dull orange and then reddening. Cere and bill-base yellow. Adult legs yellow, juvenile paler.

**FLIGHT** Rather small, pale raptor with relatively large protruding head, long and pointed but quite broad-armed wings, and short tail squared or slightly notched; wingspan 2.5 times total length. Beats fairly fast, but with wings slightly cupped, so ordinary action looks soft and floppy, almost owl-like, becoming more dashing and even reminiscent of falcon at higher speeds; always glides and soars on more or less raised wings; short glides interspersing ordinary flight characterised by arms somewhat raised, carpals jutting forward, hands flatter and angled back, but in low harrier-like hunting faster beats mixed with glides on deep V-wings; in soaring, tips more rounded. Most active in early morning and evening; often crepuscular. Foraging technique, often starting at 30–40 m, or even higher, involves much hovering interspersed by series of descents in long glides on slightly raised wings and steeper drops on U-wings with tips almost upright. **Adult** All pale grey above, with lighter head and whitish-sided tail, but for conspicuous black forearms, small black arcs on primary coverts, slightly dusky wing-tips, and black eye-patches; all white below, except for mainly blackish primaries, greyish-tipped secondaries and variable greyish tinge to sides of breast and flanks. **Juvenile** Similar general pattern, but browner above with streaked crown, duller black forearms, inconspicuous dusky arc on primary coverts, thin white lines along tips of greater coverts and flight-feathers, greyer-sided tail than adult with dusky subterminal band, and variably streaked and spotted breast and flanks; in fresh plumage, many pale tips on upperbody and scapulars, but these gradually wear away over the first three months, and distinctive rusty wash on head and chest generally even more short-lived. **Transitional first-year** After variably rapid body moult (see previous paragraph), but begins at three months in West Palearctic), much harder to distinguish from adult, but, so long as juvenile wings and tail remain (timing again variable in different parts of world range), white tips to greater coverts and flight-feathers form two lines running length of upperwings, shoulders duller black, arc on primary coverts very inconspicuous and greyer-sided juvenile tail shows dusky subterminal band.

**CONFUSION SPECIES** Pointed wings, hovering flight, large protruding head and pale colours can variously suggest Common Kestrel [277], Barn Owl *Tyto alba*, or even certain gulls *Larus*, but those all quite distinct, even at considerable distances and in poor light, not least because of absence of black shoulder-patches. Shoulder- and eye-patches usually visible and make adult in particular almost unmistakable, but, since wings are raised when gliding, consider slight possibility of confusion with adult males of grey harriers, especially Pallid [96] in Africa and Indian region during northern winter (no overlap in Palearctic summer range, slimmer build, thinner-winged, longer-tailed, black wing-tip wedge-shaped, generally different foraging behaviour). In sub-Saharan Africa, Scissor-tailed Kite [28] also grey and white (but more tern-like with deep-forked tail and graceful flight, no black on shoulders or underwing-tips, just narrow black carpal bars below).

**VOICE** Usually rather silent except in displays and around nest; even then, most calls high, weak and not far-carrying. Commonest are piping *peo-oo* in contact between sexes and in courtship, as well as in territorial advertisement by perched male (when repeated persistently in mournful series), and harsher wheezy *kwe-uk* of aggression, ending abruptly, which also basis of begging by female or young; the two calls can be mixed together. Other sounds include high-pitched, down-slurred, whistled scream of alarm or threat; chattering *kek-kek-kek...* or softer *tip-tip-tip* in territorial encounters; and hoarse *purr* from female, which may elicit from male repeated single piping *peep peep peep...* or rapid *chuk chuk chuk...*

**FOOD** Small grassland mammals, especially rodents up to c90 g (rat of 164 g recorded), usually make up bulk of food, but in some areas terrestrial birds (ranging from small doves *Streptopelia* to young gamebirds, larks, pipits *Anthus* and, in Iberia, Corn Buntings *Miliaria calandra*) frequently taken and elsewhere many orthopterans and other large insects; also lizards, small snakes, frogs. Chiefly still-hunts in open from often regular perches on tree tops, dead branches, telegraph poles and wires, sometimes using single perch continuously or, more usually, switching from one to another in series; but characteristically also forages along at 10–60 m above ground, frequently stopping to hover, then often gliding or dropping down by stages and, when prey sighted, plunging perpendicularly with wings raised and feet thrust forward, sometimes checking once more before final pounce. Occasionally searches by gliding fast and low over ground on raised wings (then looking not unlike grey-and-white harrier); will also hawk locusts and other swarming insects in flight. Small mammals and insects often eaten on wing. In tropics, most foraging in early morning and at dusk.

**SOCIOSEXUAL BEHAVIOUR** Usually seen singly in nesting season, or frequently in well-established pairs, but at other times will feed and often roost communally, particularly in Africa when prey plentiful; there, roosts of 15–20 regular in thornbush or reeds, sometimes concentrations of 50–100 or occasionally up to 500. Tail-cocking or tail-wagging very characteristic of both sexes; this action usually slow, particularly on downstroke, but can become more excited and faster in presence of

intruding kites. Single and mutual high-circling, sometimes to great heights, frequent over nesting area. Pair-members flying together frequently use *pee-oo* call (see Voice), and male may dive at female, who may then sideslip or turn and present talons; occasionally this will result in talon-grappling and even cartwheeling down for short distance. In butterfly-flight courtship, male flies around slowly with stiff exaggerated flaps.

**BREEDING** End February–early August in West Palearctic. But throughout extensive tropical range, and even outside tropics in southern Africa and northern Indian subcontinent, very unusual among raptors in frequently being double-brooded, with prolonged or variable breeding season in response to food supply: eggs or nestlings then in any month, especially as result of second broods and quick repeat attempts when first or second clutches lost (one female made seven nesting attempts, not all successful, in 19 months); in southern Africa, female may start second brood, even with different mate, when young of first brood still being tended by male; but, in general terms, peaks in egg-laying occur from end of rains into beginning of dry season in tropics, and in early spring and autumn in southern temperate regions. Small, flat structure of twigs, 25–45 cm across and 4–10 cm deep, lined with grass, usually at 3–12 m (75 cm–20 m) in top of small acacia or other thorny tree, less often in pine or broadleaf, occasionally in low bush or even on telegraph pole or pylon. Clutch 3–4 (2–6). Incubation c30–35 days. Fledging usually 33–37 days (30–38, even 40 if food short); independence c12 weeks later.

**POPULATION** Reported density estimates range from c1 pair/2.5 km<sup>2</sup> where common to c1 pair/90 km<sup>2</sup> in desert habitat. In southern Africa this is 'the most ubiquitous and probably the commonest bird of prey' (Steyn); in Transvaal alone, population estimated now at 44,000 pairs, equivalent to c1 pair/6 km<sup>2</sup>. In north Tanzania and Kenya, 'widespread and fairly common'. In north Africa, however, has declined significantly, and no evidence at all of recent breeding in Tunisia (where formerly nested in small numbers); yet in adjacent Iberia, where breeding not proved until 1944 and then not again until 1960s, Spanish population in early 1990s estimated at c1,000 pairs and Portuguese at somewhere between 100 and 1,000 pairs. No data on densities in southern Asia, where widely but patchily distributed in Indian region south to Sri Lanka and locally common or fairly common in at least some countries of mainland southeast Asia, as well as Sumatra and Kalimantan through to Moluccas, though, for example, rare in north Borneo and greatly decreased in Java. Total regular or nomadic breeding range extends to perhaps 20–25 million km<sup>2</sup>, possibly more, so that average of only 1 pair/40–50 km<sup>2</sup> would be necessary to reach seven-figure total without taking account of non-breeders, whereas the African population alone probably exceeds that figure. Although apparently affected locally by rodenticides, and by human disturbance, its mobility through nomadism, its readiness to profit from deforestation, and its abilities both to exploit temporary marginal habitats and to increase reproduction in response to food supply make this a generally successful species.

**GEOGRAPHICAL VARIATION** Up to six races sometimes distinguished, but differences small and inconstant: only three recognised here.

*E. c. caeruleus* (Africa with southwest Europe, south Arabia, and including 'vaciferus' of south mainland Asia) White on forehead narrow, breast-sides and flanks pale grey to almost white, underprimaries blackish and clearly darker than secondaries, primary coverts with at most greyish flecks near tips.

*E. c. hypoleucos* (Philippines, Greater and Lesser Sundas, including 'sumatranus' of Sumatra and 'intermedius' of Java) Larger and longer-tailed; white on forehead broader, breast-sides and flanks white, undersides of primaries paler and greyer or even whitish, primary coverts sometimes with larger dark grey spots near tips.

*E. c. wahgiensis* (New Guinea) Averages smaller; grey wash on sides of breast and blacker underprimaries like *caeruleus*, New World White-tailed Kite [24] and Australian Black-shouldered Kite [26] closely allied and formerly sometimes regarded as conspecific, but differ significantly enough in size (including relative tail length), underwing pattern and some aspects of behaviour.

Together, the three species form an almost cosmopolitan superspecies in tropical and southern regions.

**MEASUREMENTS** *E. c. caeruleus* ♂ wing 249–292 mm, ♀ 258–297 mm; ♂ tail 108–136 mm, ♀ 108–135 mm; ♂♀ tarsus 30–38 mm. *E. c. hypoleucos* ♂♀ wing 289–306 mm, tail 138–152 mm, tarsus 36–40 mm. *E. c. wahgiensis* ♂♀ wing 275–297 mm. **Weights** *E. c. caeruleus* ♂ 197–277 g, ♀ 219–343 g.

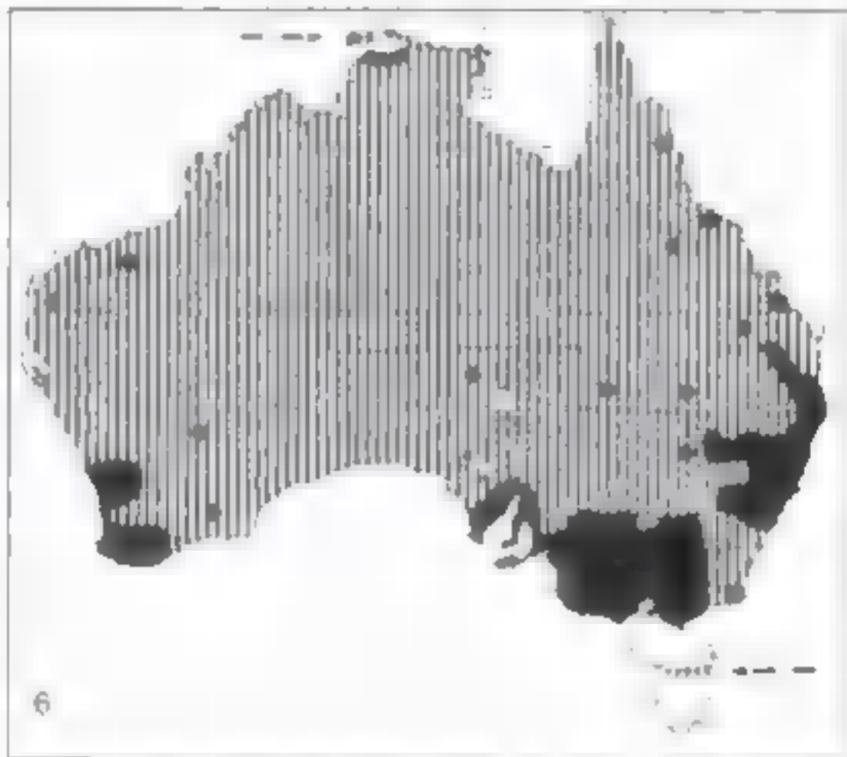
**REFERENCES** Ali & Ripley (1978), Allan (1988b), Barnard (1986), Backhurst *et al.* (1973), Beaman & Madge (1998), Beehler *et al.* (1986), Bell (1967, 1978), Benson & Benson (1975), Bergier (1987), Broekhuysen & Broekhuysen (1974), Brown *et al.* (1982), Cheng Tso-hsin (1987), Clark (1999), Clark & Banks (1992), Coates (1985), Collar (1978), Cramp & Simmons (1980), Curry-Lindahl (1960), England (1965), Etchécopar & Hür (1978), Forbes-Watson (1977), Forsman (1999), Génsbol (1986, 1995), Ginn *et al.* (1989), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Grimmett *et al.* (1998), Hagemeijer & Blair (1997), Heim de Balzac & Mayaud (1962), Hollom III *et al.* (1988), Inskipp & Inskipp (1991), Kemp & Kemp (1998), Lekagul & Round (1991), Maclean (1993), Madden (1977), Medway & Wells (1976), Mees (1981), Meininger (1991), Mendelsohn (1982, 1983, 1984, 1988a, 1989), Mendelsohn & Jaksic (1989), Meyburg & van Balen (1994), Mian & Wajid (1990), Morel & Poulet (1976), Pickford *et al.* (1989), Porter *et al.* (1981), Roberts (1991), Shirihai (1996), Shirihai & Christie (1992), Siegfried (1965), Skead (1974), Slotow *et al.* (1987), Slotow & Perrin (1992), Smythies (1981, 1986), Steyn (1963, 1971, 1982), Suetens & van Groenendael (1977), Svensson *et al.* (1999), Tarboton (1977a, 1978b), Tarboton & Allan (1984), Thiollay (1978a/b), Tucker & Heath (1995), Underhill (1986), van Balen (1994), van Marle & Voous (1988), van Someren (1956), Vaurie (1965), Wells (1999), Wood (1970), Zimmerman *et al.* (1996).

## 26 AUSTRALIAN BLACK-SHOULDERED KITE *Elanus axillaris* (Latham, 1801)

Plate 11

**DISTRIBUTION** Australasian (11°S to 39°S); order 6; varies from uncommon to common. Endemic to Australia: breeds mainly southeastern quarter, east of curved line from north of Cairns, Queensland, to western side of Eyre Peninsula, South Australia, but also southwest corner (increasing), northwest coastal strip of Western Australia, and around Darwin and Melville Island, Northern Territory; at times may appear almost anywhere, especially in less arid areas.

**MOVEMENTS** Sedentary or nomadic, even almost eruptive: numbers fluctuate in conditions of drought or floods, and in response to populations of small rodents and grasshoppers. Longest ringing recovery South Australia to eastern New South Wales (almost 1,000 km). Although breeding regularly on north side of Bass Strait, only rare vagrant to King and Flinders Islands and Tasmania.



**HABITAT** Open woodland, grassland or farmland with clumps of or scattered trees, tree-lined watercourses, drier marshland, market gardens, even grassy sites or waste ground in urban areas; also coastal sand-dunes, especially in south and west. Prefers grass, crops or other ground cover in height range 30–150 cm. Sea-level to 1,500 m.

**FIELD CHARACTERS** Small falcon-shaped kite, rather gull-like in colour and wing actions, with relatively large rounded head. Perches at angle, often prominently, on tree top, dead branch, telegraph pole, fence post or wire cable, sometimes cocking and lowering tail (see Socio-sexual Behaviour); long wings clearly exceed tip of short tail. Sexes similar and female averages only 1% larger (though perhaps up to 15% heavier); juvenile distinguishable, but starts moulting within few weeks or months of leaving nest, and slowly and variably assumes adult plumage during first year, retaining flight-feathers and tail until 9–12 months old.

**PERCHED Adult** Mostly pale grey above (palest on crown, nape and tail, darkest on primaries) and otherwise white (including forehead, cheeks and underbody), except for contrasting black wing-coverts and black patch in front of bright red eyes (this extending behind as thin black

eyebrow). **Juvenile** Basically similar pattern, but washed rusty-brown on back and, for first few weeks only, more obviously so on crown, nape and breast, which also finely dark-streaked; back and greyish wings, with reduced black shoulders (lesser and median coverts only), all tipped whitish; face, throat and abdomen also whitish; black eye-patches much as adult, but eyes not red at first. **Bare parts** Adult eyes ruby-red; juvenile changes from grey-brown through yellow-brown and orange to orange-red over first year. Adult cere yellow, juvenile yellow-brown. Adult legs bright yellow, juvenile yellow-white to pale yellow.

**FLIGHT** Small, pale raptor with wide protruding head, somewhat owl-like, long broad wings generally rather pointed (but looking blunter-tipped when hovering or soaring), and short notched or squared tail, shorter than wing-base; wingspan 2.5 times total length. Winnowing flight with soft steady beats, interspersed with long glides on angled wings with arms raised, carpal joints pressed forward, and hands level but bent back; soars on straighter wings but still in modified dihedral; frequently hovers (see Food). **Adult** From above, mainly grey with darker primaries, whiter head, and obvious black fore-wings; from below, all white but for dark grey wing-ends beyond black carpal patches. **Juvenile** Rusty-brown above with whitish tips, greyer tail and wings, and less conspicuous dark shoulders; from below, pattern much as adult but body and wing-linings rustier at first, breast also dark-streaked, and wing-tips paler and browner, so small black carpal patches more obvious.

**CONFUSION SPECIES** When perched, very similar to more nocturnal Letter-winged Kite [27], which only slightly paler and browner-grey, with more owl-like face caused by larger black patch in front of and around bigger eyes (but not extending behind as eyebrows); distinction easier in flight, when Letter-winged shows broad black band across mid-underwings from body to carpal joints (though this may be broken, even absent, on juvenile) and paler translucent primaries, as well as different wing action. Otherwise, persistent hovering suggests Australian Kestrel [282] (narrower wings, longer tail with dark subterminal band, less clear white below with less contrasting primaries and no carpal patches, mainly rufous above with blackish flight-feathers). Colouring might cause confusion with Grey Falcon [300] (no black shoulders above or carpal patches below, less contrasting primaries, barred tail, and quite different behaviour) or even Grey Goshawk [120] (short rounded wings without black markings, much longer tail and legs, no hovering and, again, quite different flight and behaviour).

**VOICE** Usually silent except in breeding season, and even then calls rather weak, though sometimes persistent, mainly high whistled *chee-chee-chee* or *chip-chip-chip* and harsh wheezing *steeah* (cf. Black-shouldered Kite [25]).

**FOOD** Mainly small mammals (especially house mice) and large insects (notably grasshoppers); some lizards and small birds. Most prey taken on ground. Forages by quartering and hovering head to wind, sometimes for minutes on end, with fast and flat but rather irregular

beats of outstretched wings, tail spread and legs often dangling, or sometimes by fast glide, dropping on to prey with wings raised high above back. Also still-hunts. Prey eaten in flight or carried to perch. Active both by day and at dusk, occasionally even on moonlit nights (cf. Letter-winged Kite [27]).

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in pairs, sometimes small family parties, but also roosts communally and is loosely gregarious at times of irruptions, when 70+ seen feeding together. Aerial displays include single and mutual high-circling, butterfly-flight, and one bird diving at mate who then rolls over and presents claws; last may be followed by grappling and brief cartwheeling. On alighting, tail often flicked up and lowered again; this action may be repeated persistently, possibly as territorial demonstration: see Black-shouldered Kite [25]. All display activities usually accompanied by much weak calling.

**BREEDING** March–January, but mostly June–October in east and November–January in west; throughout year when food abundant, and then often double-brooded. Flat nest of thin twigs, 27–45 cm across and 10–15 cm deep, lined with green leaves, 4–35 m up in fork of large tree (rarely on artificial structure). Clutch 3–4 (2–5). Incubation 29–34 days. Fledging 33–38 (42+) days, according to food supply, with dependence up to c1 month.

**POPULATION** No meaningful published measures of abundance, but species recorded in 52% of atlas squares

and breeding range covers about 1.5 million km<sup>2</sup>; even if average density as low as, say, 1 pair/25 km<sup>2</sup> (cf. Black-shouldered Kite [25]), the population must be well into six figures. Clearance for agriculture has provided good hunting grounds and encouraged populations of house mice. Although kite numbers fluctuate in many areas, as result of nomadism in response to food supply, they seem to be increasing and the range expanding: established firmly in Western Australia and southwest Victoria only since 1940s and 1950s respectively, though certainly recorded in both areas well before those periods.

**GEOGRAPHICAL VARIATION** Monotypic. One of three all-species that together form an almost cosmopolitan superspecies, the others being White-tailed Kite [24] of Americas and Black-shouldered Kite [25] of southwest Europe, southern Asia to New Guinea, and Africa. Sometimes treated as conspecific, they differ in size, wing-tail proportions, colour of back, underwing pattern, and juvenile plumage.

**MEASUREMENTS** ♂ wing 274–309 mm, ♀ 280–318 mm; ♂ tail 133–153 mm, ♀ 138–155 mm; ♂♀ tarsus 32–39 mm. **Weights** ♂♀ 181–365 g; ♂ 181–300 g, ♀ 270–340 g.

**REFERENCES** Baker-Gabb (1984a), Blakers *et al.* (1984), Condon (1937), Cupper & Cupper (1981), Hollands (1984), McLaughlin (1989), Marchant & Higgins (1993), Mathieson *et al.* (in press), Olsen & Marples (1993), Olsen & Olsen (1987a), Olsen *et al.* (1993), Pedler (1976), Ragless (1958), Schodde & Tidemann (1988), Twigg & Kay (1994).

## 27 LETTER-WINGED KITE

*Elanus scriptus* Gould, 1842

Plate 11

**DISTRIBUTION** Australasian (extremes 12°S to 39°S, but typically 19–34°S); order 15; sparse or rare to locally common. Endemic to Australia: main breeding areas in far inland parts of Northern Territory, Queensland, South Australia and New South Wales, from Barkley Tableland and headwaters of Georgina and Diamantina Rivers south to Lake Eyre and Darling River; but at times appears (and may even nest) almost anywhere on mainland except western desert regions and far northeast.

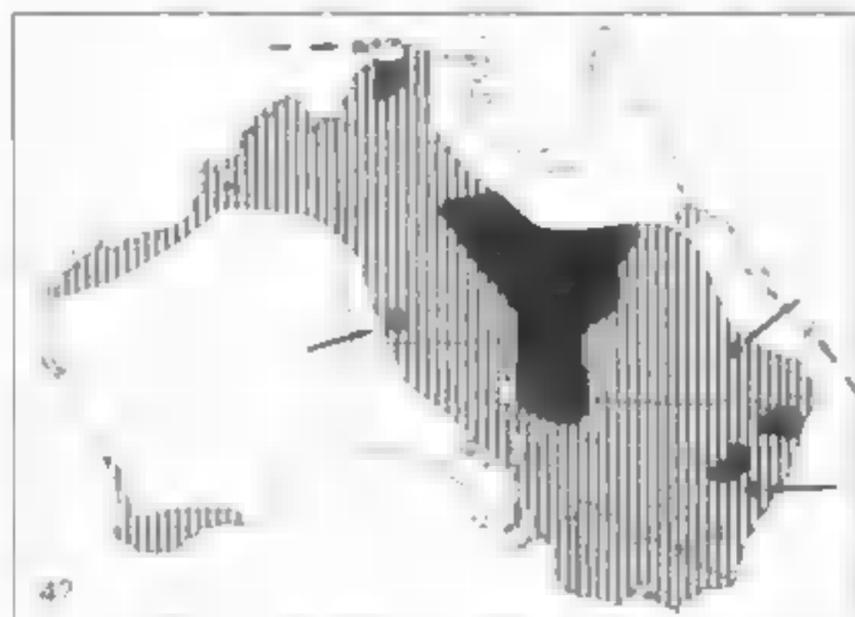
**MOVEMENTS** Nomadic and eruptive in response to drought- and rain-affected population fluctuations of main prey (see Food) and its own numbers. Last big

eruptions 1976–77 and 1993–95, much smaller one 1980–81. Otherwise disperses locally.

**HABITAT** Tree-lined watercourses and timbered boreholes in dry grassland and other arid open country of the interior. During eruptive movements, may appear almost anywhere, reaching open coasts and inshore islands, rarely even breeding in such atypical habitats. Sea-level to 1,000 m.

**FIELD CHARACTERS** Small, pale, falcon-shaped kite with relatively large rounded head, very like Australian Black-shouldered [26], especially when perched, having similar pattern and somewhat gull-like appearance. Perches prominently, usually on trees though often on artificial structures, but apparently does not raise and lower tail like Black-shouldered; long wings again clearly exceed tip of short tail. Sexes similar, but apparently greater RSD than other *Elanus* kites, female averaging 5% larger, 8% longer-tailed and 20% heavier; juvenile easily distinguishable, probably moults slowly and variably into adult plumage during second half of first year, retaining flight-feathers and tail until last.

**PERCHED Adult** Mostly pale grey above, with paler tail, contrasting black wing-coverts, and black patch in front of bright red eyes; the grey tends to have slightly browner tone than Black-shouldered Kite and to extend less on to crown and nape, while the primaries are not much darker than the rest; also, face rather more owl-like as result of increased black in front of and around larger



eyes (but not extending back as eyebrows), and both cere and legs are much less yellow. **Juvenile** Likewise resembles juvenile Black-shouldered, but is darker above, more chestnut-brown than rufous, with clearly darker crown and less conspicuous rufous (not whitish) tips, as well as more orange-brown breast; form of black eye-patches much as adult, but eyes not red at first; again, reduced black shoulders and whitish face, throat and abdomen. **Bare parts** Adult eyes ruby-red, juvenile changes from brown to orange-red during first year. Adult cere horn-coloured, juvenile greyer. Adult legs cream to whitish-flesh, juvenile creamy.

**FLIGHT** Small, pale raptor with wide protruding and somewhat owl-like head, long broad wings rather pointed, but looking blunter-tipped at times, and short notched or squared tail, shorter than wing-base; shape thus all much as Australian Black-shouldered Kite; wingspan 2.4 times total length. Flight also broadly similar – including glides on angled wings with arms raised, carpal joints pressed forward, and hands level but bent back, and soaring on straighter wings still in modified dihedral – but subtle differences in more buoyant and tern-like action and, even when hovering, often deeper and slower beats. **Adult** From above, mainly grey with obvious black forewings and whiter head and tail; from below, broad black band runs from axillaries across median and greater coverts to carpal joints and primary coverts, thus forming flattened M or W; otherwise all white underneath, with translucent secondaries and pale grey primaries. **Juvenile** Chestnut-brown above with rufous tips, greyer tail and wings, and less conspicuous dark shoulders; from below, dominant feature usually the wing-band, or 'letter', but this blackish rather than black, less clear-cut, often broken or relatively faint, and sometimes absent; in last case, can look very like juvenile Black-shouldered, but with unstreaked and more orange-brown breast and wing-linings, and paler grey-brown wing-ends.

**CONFUSION SPECIES** When perched, very similar to more diurnal Australian Black-shouldered Kite [26], which only slightly purer grey above, with rather less owl-like face as result of smaller black patch in front of eyes extending behind as eyebrows. Distinction easier in flight: then adult Black-shouldered, lacking any black band across mid-wings from body to carpal joints, looks all white from below but for dark grey wing-ends with relatively small black carpal patches; juvenile similarly has distinct black carpal patches that show up against greyish primaries still obviously darker than rest of wings. Black-shouldered also has faster, less buoyant, more direct flight and is typically more diurnal (though starving Letter-winged during periodic eruptions may also be). Otherwise, persistent hovering or grey-and-white coloration may again suggest Australian Kestrel [282], Grey Falcon [300] or even Grey Goshawk [120]; see under Australian Black-shouldered Kite. When hunting at night, some possibility of confusion with Barn Owl *Tyto alba* and Eastern Grass Owl *T. longimembris*, but those both have larger head, broader rounded wings, and long dangling legs.

**VOICE** Apparently noisy at any season, perhaps because of gregarious behaviour or extended breeding. Various whistling and rasping calls rather similar to those of Australian Black-shouldered Kite [26]. Recorded sounds

include clear whistle of alarm, and loud chattering *kak-kak-kak* by both sexes; high *chirp-chirp-chirp* by male with food; harsher *kar-kar-kar* by female at nest, and *wee-er* *wee-er* when soliciting food.

**FOOD** Almost entirely small mammals, especially rodents, also some small reptiles and large insects when favoured food scarce, and one record of honeyeaters (Meliphagidae). Long-haired rats *Rattus villosissimus* often dominant rodent prey; after heavy rains, these may reach plague proportions and radiate out from refuge areas, whereupon the kites rear large broods and continue breeding; when the land dries up, the rats disappear and the kites disperse eruptively. House mice now also known to be significant as food, following this kite's adaptation to human environments. Almost all prey taken on ground. Forages regularly by hovering and also still-hunts, in same way as Australian Black-shouldered Kite [26]; additionally, quarters low over ground with deep slow beats and is characteristically crepuscular or nocturnal, usually hunting at dusk or by moonlight, though starving vagrants in strange habitats during periodic eruptions may become more diurnal.

**SOCIOSEXUAL BEHAVIOUR** Although sometimes singly during irruptions into fringe areas, typically gregarious; nests colonially in groups of up to 20 and occasionally 50 pairs, and roosts may number several tens (though smaller outside breeding season). Butterfly-flight noted near colonies; sometimes soars, but high-circling not apparently significant as display.

**BREEDING** Colonial, occasionally solitary. August–January, but at times of rodent plagues certainly as early as May and probably in any month. Flat nest of thin twigs, c28–38 cm across and c20–30 cm deep when new, but up to 74 cm across and 58 cm deep after repeated use, lined with green leaves and felted fur, sometimes also with cattle dung, old nests also becoming fouled with droppings and debris; at 2–11 m in tree. (Even in colony of 20 pairs, seldom more than 1 pair/tree.) Clutch 4–5 (3–6). Almost no data on incubation and fledging periods: likely to be c28 days (record of 36 days may apply to whole clutch) and 30–35 days.

**POPULATION** Numbers impossible to assess. Main breeding range extends over perhaps 1 million km<sup>2</sup>, but this species generally scarce to rare, with patchy distribution, and recorded in only 14% of atlas squares (even including those involved in small irruption of 1980/81). Colonies of 20–40 birds along one stretch of Diamantina River, on border of South Australia and Queensland, were 7–10 km apart, but restriction to such watercourses results in linear distributions. Clearly many fewer in total than Australian Black-shouldered Kite [26], but population of four figures (perhaps in upper thousands) is no more than wild guess. In some areas may have benefited from human activities, but no real evidence of increase or decrease. Nevertheless, overgrazing by domestic stock may have adverse effect on habitat already degraded by regular droughts, and threat also posed by feral cats which take young from nests.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 292–313 mm, ♀ 301–319 mm; ♂ tail 138–156 mm, ♀ 130–165 mm; ♂♀ tarsus 33–40

mm. **Weights** 160–427 g; ♂ 217–333 g (five), ♀ 290–422 g (six).

**REFERENCES** Baker-Cabb & Pettigrew (1982), Britton *et al.* (1986), Garnett (1974), Collins & Jessop (1995), Cupper &

Cupper (1981), Ey (1984), Garnett (1992), Hollands (1977, 1979, 1984), Jackson (1919), Marchant & Higgins (1995), Mathieson *et al.* (in press), Olsen & Marples (1993), Olsen *et al.* (1993), Pettigrew (1982), Schodde & Mason (1980), Schodde & Tidenmann (1988).

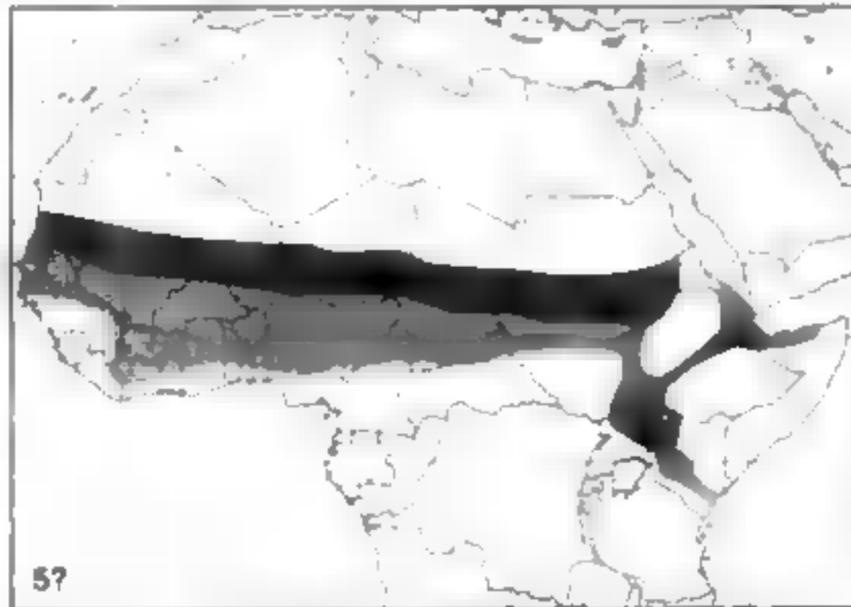
## 28 SCISSOR-TAILED KITE *Chelictinia riocourii* (Vieillot, 1822)

Plate 8

Other names: African Swallow-tailed Kite, Fork-tailed Kite

**DISTRIBUTION** Atropical (extremes 19°N to 1°S, mostly 15°N to 8°N); order 5; decrease in West Africa from late 1980s, but still locally common. Endemic to sub-Saharan Africa and, except locally in Kenya, remains entirely north of equator; breeds in narrow Sahel zone from Senegal, southern Mauritania and Mali through southern Niger and northernmost Nigeria to north-central Chad and Sudan; also in north and west Ethiopia, northwest Somalia and Lake Turkana region of north Kenya, as well as small and isolated resident population in Rift Valley in southwest Kenya.

**MOVEMENTS** Generally migratory, to differing extents in different years, and often nomadic within African tropics, though still staying almost entirely north of equator. Most spend non-breeding season (chiefly October–February, some to June in extreme west where nests much earlier; see Breeding) immediately south of their breeding range, in savannah country from Gambia, Guinea and Ivory Coast across to south-central Chad and Sudan. In Ethiopia and north Somalia may be found in some places throughout year, and in Kenya (where only small numbers nest or have nested in two areas) and northeast Uganda mainly non-breeding visitor from northern tropics, regularly reaching dry grassland and open cultivation in central and, sometimes, even south-east Kenya (to 5°S) during November–March. In contrast, Lake Turkana population possibly moves north after breeding.



**HABITAT** Arid belt of north tropical Africa, breeding in semi-desert with acacias and then moving short distance south into dry short-grass savannah, irregularly into long-grass areas. Sea-level to 500 m.

**FIELD CHARACTERS** Small slim kite, grey and white as adult, with weak bill, fairly broad head, short stout

legs, long pointed wings, and unusually long and deeply forked tail; wing-tips half down tail, beyond base of fork (juvenile's shorter wings also fall well short of its much shorter tail). Perches conspicuously, on tree or shrub; sometimes cocks and lowers tail like Black-shouldered Kite [25]. Sexes similar, and female barely even averages larger; juvenile easily distinguishable; appears to start moulting into adult plumage within six months.

**PERCHED Adult** Generally pale grey above with white forehead extending back, black patch around red eyes, blackish-edged scapulars and white-tipped inner flight-leathers; all white below. **Juvenile** Darker brown-grey above with clear rufous edgings, similar forehead and black eye-patches but grey eyes, black narrow white tips to remiges, buff-tipped tail, more cream below, with thin dark-streaked buff chest-band. **Bare parts** Adult eyes red, juvenile grey at first, changing through yellow-brown and orange. Cere grey. Legs pale yellow, duller on juvenile.

**FLIGHT** Small raptor, varying in proportions and shape, as well as plumage, depending on age; adult wingspan typically 2.0 times total length. Spends much time in air; flies with fast buoyant beats; glides on slightly raised wings, carpal joints thrust forward and primaries angled back; often soars, frequently hovering or, more precisely, hanging motionless into wind with briefly fanning wings and widely spread tail. **Adult** Delicately built and graceful, almost tern-like, with long pointed wings and unmistakable tail-lock; grey above with white trailing wing-edges; and all white below but for sharply contrasting black bar on outer carpal areas, greyer primaries and grey tail-edges. **Juvenile** Less graceful, with much shorter, round-tipped wings, barely forked tail looking square when spread; darker above, again with thin white trailing edges, and whitish below with darker breast-band, greyer primaries, grey tail.

**CONFUSION SPECIES** Adult unmistakable. Lone juvenile could conceivably be confused with juvenile Black-shouldered Kite [25], but that has relatively longer wings nearly reaching tail-tip, and clearly darker shoulders; also white edges above (abraded quite quickly) and more extensively pale rufous-buff underparts with fine dark streaking (no breast-band).

**VOICE** Usually silent. Noisy when breeding, with rapid rasping and chattering calls; softer whistles and feeble mew also recorded.

**FOOD** When breeding, many skinks and other lizards, also small snakes and sometimes rodents; otherwise chiefly insects and spiders. Occasionally quarters low over ground, but usually hunts by hovering or kiting and dropping on to prey. Also catches insects on wing, notably at grass fires, and may gather in large numbers, even hundreds, to feed on locusts and emerging

grasshoppers. Loose flock of up to seven seen associating with cattle in Nigeria, flying over herd and swooping among them to catch insects, also hovering, and occasionally soaring higher, but repeatedly returning to cattle.

**SOCIOSEXUAL BEHAVIOUR** Gregarious: nests in loose colonies of up to 20 pairs; roosts together in smaller groups; and often feeds semi-socially, several within sight of each other. No published data on displays.

**BREEDING** Loosely colonial, or sometimes single pairs. Apparently May–August in most of range, but December–February in Senegal. March–June or August onwards in Kenya. Small stick nest, 30–40 cm across with deep cup, at 2–8 m in acacia or dense thorny bush (e.g. *Balanites*); often near to nest of larger raptor (e.g. Brown Snake-eagle [70], Secretarybird [249]) and sometimes quite close to human habitation. Clutch usually 4. No information on incubation or fledging periods. Nest becomes conspicuously whitened in later stages.

**POPULATION** Few data on numbers or densities. Although main breeding range confined to narrow band only 100–150 km from north to south, it extends for more than 6,000 km almost right across Africa and, with

notional minimum area of, say, 600,000 km<sup>2</sup>, average of only one colony of 10 pairs/1,200 km<sup>2</sup> would be required to reach five-figure total: this may not seem unlikely, but apparent decline over much of West Africa since about 1970, particularly as result of locust control during 1986–89, suggests it might now be optimistic. Though not unduly affected by human presence – indeed, often nesting not far from houses or villages, and frequenting poor cultivation where trees removed – vulnerable to pesticides.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 225–246 mm, ♀ 227–254 mm; ♂ tail 170–216 mm, depth of fork 80–115 mm; ♂ tarsus 28–33 mm. **Weights** No data other than one 'fat individual' that weighed 110 g.

**REFERENCES** Ash & Miskell (1983), Blankenship *et al.* (1971), Britton (1980), Brown *et al.* (1982), Davey & Davey (1980), Dewhurst & Fishpool (1984), Gatter (1988), Gore (1990), Gregory (1982), Jensen & Kirkenby (1980), Lewis & Pomeroy (1989), Morel & Morel (1990), Mullie *et al.* (1992), Nikolans (1987), Setle *et al.* (1977), Short *et al.* (1980), Stow (1978), Sutton *et al.* (1984), Thollay (1978c), Zimmerman *et al.* (1986).

## Accipitridae (d: true kites)

### 29 SNAIL KITE

*Rostrhamus sociabilis* (Vieillot, 1817)

Plate 12

Other name: Everglade Kite (Florida race)

**DISTRIBUTION** Neotropical and, marginally, Nearctic (27°N to 39°N); order 7; fairly common to locally abundant in main South American range, but rather rare or patchily distributed farther north. Southeast USA, Central America and much of South America: south Florida (more widespread until 19th century); Cuba and Isla de la Juventud (Ile of Pines); southeast Mexico (Veracruz to Yucatan Peninsula and, on Pacific slope, extremely locally Guerrero to Chiapas) through Central America (Belize, north Guatemala, northwest Honduras, to Costa Rica, but rare or casual elsewhere); and in South America from Colombia only to Ecuador in west but, east of Andes, more widespread in suitable open habitat in all countries south to north and east Bolivia and north and east-central Argentina (as far as Tucuman, Cordoba and Buenos Aires), including Uruguay and sizeable part of Brazil.

**MOVEMENTS** Often sedentary, but leaves southernmost breeding areas of Argentina in winter; also varyingly nomadic dispersal and arrival elsewhere in response to seasonal droughts, floods, and snail emergence (see Food); vagrant Trinidad.

**HABITAT** Open freshwater marshland, rushy lakes and lagoons, ricefields and similar low-lying wetlands, with mainly low vegetation below 3 m apart from scattered trees and shrubs, but replaced in forested swamps by Slender-billed Kite [30]. Continuous flooding essential for snail abundance (see Food). Sea-level to 1,800 m, rarely wandering to 2,600 m, but mainly below 1,000 m.



**FIELD CHARACTERS** Medium-sized kite, mostly blackish, or dark brown and streaked, with long wings, squared tail, and distinctive bill whose upper mandible is exceptionally long and markedly sickle-shaped. Perches openly at any height from tree tops, bare branches, and

telegraph poles or wires to low bushes or waterside banks (in one study, spent 62% of time perched); wing-tips extend beyond tail-tip. Sexes dissimilar in plumage; females average less than 3% larger (and perhaps only 15% heavier), but biggest may be up to 14% larger than smallest males; juvenile very like adult female, but separable; apparently not fully adult until third year. In all plumages, black or dark brown tail has white base (more extensive below) and white coverts (above and below), as well as grey and white or whitish tip.

**PERCHED Adult male** All slaty-black but for white areas of tail; bare parts orange-red. **Adult female** Mainly dark brown, thinly edged rufous on back and shoulders, and variably and irregularly blotched with cream to rufous below; usually distinctive face pattern of dark eye-stripe separating creamy-buff supercilia and cheeks to throat (but older females resemble brownish males, with blacker all-dark head and mantle and more uniformly dark underbody with only slight paler mottling); bare parts yellow-orange. **Juvenile** Much like adult female, but streaked crown, broader rufous-buff edges above, and predominantly creamy below with bold dark streaks; bare parts lack orange or red. **Second-year** As juvenile, but less broadly edged rufous above and more heavily streaked below. **Third-year male** Slow moult into adult plumage. **Bare parts** Adult eyes bright red, juvenile brown. Adult male facial skin and cere orange-red, female yellow-orange, juvenile whitish-yellow, second-year yellow. Adult male legs orange, female yellow-orange, juvenile yellow.

**FLIGHT** Medium-sized raptor with longish paddle-shaped wings, squared and slightly notched tail, usually noticeable thin hooked bill, and obvious white rump and tail-base in all plumages; wingspan 2.5 times total length. Flies slowly with floppy beats of distinctively shaped wings, constantly moving tail; glides and, less markedly, soars on bowed wings, sometimes to great heights. **Adult male** Slaty-black. **Adult female** Browner, with creamy face and dark eye-stripe (sometimes dark head), predominantly dark but variably paler-blotched underbody, darker wing-linings more barred blackish and rufous, and barred flight-feathers with paler bases (usually obvious light patch on primaries). **Juvenile** Often hard to distinguish from adult female, but generally paler below with distinct dark streaks and, at close ranges, streaked crown and yellowish cere and legs.

**CONFUSION SPECIES** Almost unmistakable in all plumages: even at considerable ranges when extended bill and bare facial skin not visible, quickly identified by open habitat, paddle-wings, heron-like flight, and white tail-base. Other snail-eating kites largely allopatric in forested swamps: smaller Slender-billed [30] shorter-winged and short-tailed, adult all dark, juvenile with 2-3 thin whitish tail-bars; slightly larger Hook-billed [15] longer-tailed and much shorter-winged, very variable in plumage but males and dark morphs have one to two tail-bands, while females and juveniles show two to three and quite different under-patterns. Harriers [94, 95, 103] have different shape and flight (long narrow wings, raised in V) and white uppertail-coverts, but no white on tail. See also black hawks [176-178] (much bulkier), Slate-coloured Hawk [165], Crane-hawk [164] and juveniles of Savannah Hawk [179] and Yellow-headed Caracara [257].

**VOICE** Often noisy, especially when breeding, but usually silent when still-hunting alone. Sheep-like bleating or 'watchwinding' *wah-hah-hah...* used by perched female to elicit courtship. When disturbed near nest by humans or other kites, distinctive creaky, ratchet-like clicking *krikuk-ik-ik, ik, ik, ik, or ka-ka-ka-ka...*, a rather apologetic and not far-carrying protest that tails away but is constantly repeated; also single squawked *konwa-ker-wuck ker-wuck* at roosts, in male aerial displays, or towards other kites.

**FOOD** Almost exclusively, large freshwater apple snails *Pomacea*, also smaller snails *Marisa*; but locally (Brazilian Mato Grosso, Venezuela) freshwater crabs *Dilocarcinus* and once each (Florida) small turtle and small rodent. Forages by transects or by haphazard quartering with slow flapping at 2-8 m over marshland; also still-hunts in middle of day and in short vegetation from generally low bush, post or wire by ditch or pond. When sighting snail, swoops down and snatches it from vegetation or the top 20 cm of water with one foot (perhaps even wetting belly in process) and then usually, sometimes immediately, transfers it to bill in flight (but any empty shell is quickly dropped). Snail is taken to favoured feeding perch, which may be bush or post, or even waterbird's rush nest or platform, and held with one or both feet. Kite uses extended hook of upper mandible to cut snail's columellar muscle before extracting it: shells are left whole and several tens or hundreds may accumulate on ground below. Has been recorded snatching snails from that other great water-snail predator, the Limpkin *Aramus guarauna*.

**SOCIOSEXUAL BEHAVIOUR** Often still-hunts singly, but usually social to gregarious: nests in small loose colonies, though occasionally solitary, while communal roosts, often mixed with herons (Ardeidae), may hold several hundreds and sometimes even 1,000+. High-circling by one or several sometimes incorporates simple but elegant undulating sky-dance by males mostly, with short plunges on closed wings. Two or more birds may also fly at each other, somersault and grapple talons. Butterfly-flight by males mostly, with emphatic downbeats, used both in pair-formation and against intruding kites and potential predators.

**BREEDING** Loosely colonial. Season varies considerably with latitude, but often extended: February-August in Florida, January-September in Surinam, August-March in Argentina; copulation noted in southern Brazil (Rio Grande do Sul) in August. Rough flattened, bulky nest of twigs, 30-40 cm across and 10-30 cm deep, lined with rushes and herbs and grass; usually at 60-150 cm in emergent vegetation or low bushes, sometimes at 2-5 m in small trees, occasionally up to 10 m, but always in cover growing in, over, or surrounded by, water. Clutch 2-3 (2-5). Incubation 26-28 days. Fledging 23-30 days, though returning to nest up to 49 days to perch, roost or feed. Possibly double-brooded, or even triple-brooded, in optimum conditions.

**POPULATION** Breeding distribution encloses over 14 million km<sup>2</sup>: two-thirds of that vast area too forested, too dry or too high, but in lowland fresh marshes of South America this kite is often so numerous that 100+ perched individuals may be counted along 5-10 km of waterside track in north Argentina, and literally hun-

dreds together at roosts. Elsewhere, habitat alteration main cause of decline: desiccation and drainage have disrupted natural cycles by diverting water to sea, and in southeast Brazil, where still common in Rio Grande do Sul and coastal Santa Catarina, swamps and marshes are being drained for reforestation with eucalyptus, as indeed they now are in some provinces of northern Argentina (notably Entre Rios and Corrientes). Such schemes provide local or regional threats, but this species can adapt to human-altered habitats where (and only where) its food snails are plentiful. In some areas, too, pesticides are serious problem.

**GEOGRAPHICAL VARIATION** Four races usually recognised, but poorly differentiated, mainly on wing length and bill size.

*R. s. sociabilis* (Nicaragua into South America) Smallest race, shortish bill.

*R. s. major* (southeast Mexico to Guatemala) Largest race, longest bill.

*R. s. plumbeus* (Florida) Averages smaller than *major*, distinctly shorter-billed.

*R. s. levis* (Cuba, Isla de la Juventud [Isle of Pines]) Bill longer than *sociabilis* or *plumbeus*, but shorter than *major*.

**MEASUREMENTS** *R. s. sociabilis* ♂ wing 325–355 mm,

♀ 328–370 mm; ♂ tail 158–189 mm, ♀ 167–196 mm; ♂♀ tarsus 36–39 mm, bill to feathers 31–33 mm. *major* ♂ wing 370–382 mm, ♀ 365–380 mm; ♂ tail 180–210 mm, ♀ 188–200; ♂♀ bill 36–40 mm. *R. s. plumbeus* ♂ wing 340–368 mm, ♀ 345–373 mm, unsexed to 376 mm; ♂♀ tail 170–193 mm, tarsus 51–57 mm, bill 29–32 mm. *R. s. levis* ♂♀ wing 350–371 mm, bill 33–35.5 mm. **Weights** ♂ *R. s. sociabilis* 304–385 g (four), ♀ 384–413 g (two).

**REFERENCES** Albuquerque *et al.* (1986), Amadon (1975, 1983), Beissinger (1983, 1986, 1987a/b, 1989a/b), Beissinger & Snyder (1987), Beissinger & Takekawa (1983), Beissinger *et al.* (1983, 1988), Belton (1984), Blake (1977), Boune (1985a, b), Chandler & Anderson (1974), Clark & Wheeler (1987), Contreras *et al.* (1990), de la Peña (1992), Ejdová & Krabbe (1990), Garrido (1985), Haverschmidt (1951, 1962, 1968, 1970), Hayes (1991), Hiltz & Brown (1986), Howell & Webb (1995), Kushlan & Bass (1983b), Mader (1981), Miller & Tilson (1985), Meyer de Schauensee & Phelps (1978), Murphy (1955), Nason & Di Giacomo (1993), Nichols *et al.* (1980), Nicholson (1926), Palmer (1988), Ridgely & Gwynne (1989), Rodgers *et al.* (1988), Sick (1993), Slud (1964), Snyder & Kale (1983), Snyder & Snyder (1969, 1970, 1971), Snyder *et al.* (1989), Spurr (1945), Steigitz & Thompson (1967), Stiles & Skutch (1989), Sykes (1979, 1983a/b, 1984, 1985a–b, 1987), Sykes & Kale (1974), Takekawa & Beissinger (1983, 1989), Vermeer *et al.* (1974), Voous (1969), Voous & van Dijk (1973), Wheeler & Clark (1995), Wiley (1985, 1989a/b), Wotzkow (1986a).

## 30 SLENDER-BILLED KITE

*Rostrhamus hamatus* (Temminck, 1821)

Plate 12

**DISTRIBUTION** Neotropical (12°N to 13°S); order 5; uncommon to locally fairly common. Southernmost Central America and northern South America: easternmost Panama (east Darién), north and east Colombia, parts of Venezuela, and north Guianas, through Amazonian Brazil to tropical forested areas of east Ecuador (Limoncocha), northeast Peru, and northernmost Bolivia (Pando, Beni).



**MOVEMENTS** Probably fairly sedentary, but no data.

**HABITAT** Lowland wet forest, usually at edges and especially by shallow lagoons and drying floods, extending into wooded swamps; locally, at least in Surinam,

also coffee plantations near pools. Replaces Snail Kite [29] in forest areas. Sea-level to 750 m.

**FIELD CHARACTERS** Smallish kite, dark grey with no white, relatively shorter-winged, and clearly shorter-tailed than Snail Kite [29], but again with similar long and markedly decurved upper mandible. Perches less conspicuously, often motionless within waterside cover of trees or bushes; wing-tips short of tail-tip. Sexes similar; female apparently only 2% larger and perhaps 3% heavier; juvenile not dissimilar, but easily distinguishable; like adult once quill moult completed.

**PERCHED Adult** All dark slate-grey, slightly paler on mantle, blacker on flight-feathers and tail; no white; cere and legs orange. **Juvenile** Fairly similar, but less dark grey and with rufous-buff to cream ups and edges on scapulars, wings and undertail-coverts, as well as two to three thin whitish tail-bars and tail-tip. **Bare parts** Adult eyes white to pale orange-yellow, juvenile pale grey-brown to grey-white. Adult facial skin, cere and legs yellow-orange to orange-red, juvenile dusky-yellow, becoming dull yellow-orange.

**FLIGHT** Smallish-medium raptor with chunky shape, broad rounded wings, strikingly short squared tail, and noticeable thin hooked bill; wingspan 2.2 times total length. Looks clumsy in flight, with slow floppy beats; soars regularly above canopy, though usually not high; wing positions in soaring and gliding not described.

**Adult** Looks all slaty-black but for pale eyes and orange cere and feet. **Juvenile** Dark grey, slightly paler than adult, with two to three thin whitish bars on black tail; from above, pale fringes may break up uniformity of

wing-coverts and rump; from below, fine pale barring on crissum and obscure bars on dark-tipped flight-feathers; duller, yellower cere and legs.

**CONFUSION SPECIES** Unlikely to be mistaken for other snail-eating kites: Snail Kite [29] (open marshland, white rump and tail-base, female and juvenile quite different) or dark morph of Hook-billed [15] (greenish face with orange spot above, much heavier beak, longer tail with broader band or bands). Perhaps more confusable with Slate-coloured Hawk [165] (heavier head, longer and more rounded tail, adult with single white bar and, though juvenile shows two tail-bars, that has dark-banded whitish underwings). Rather similar, if smaller, Plumbeous Hawk [166] is very rare and confined to Pacific region of Panama to northwest Peru (similar differences, plus much whiter underwings). Adult black hawks [176-178] are bigger and heavier, with single broad tail-band, yellower face and legs.

**VOICE** Descriptions include mewling *weewuuu*, apparently not unlike small biterc; and nasal *wherruuuuuh* with buzzy kazoo-like quality, rising then falling.

**FOOD** As Snail Kite [29], large freshwater snails *Pomacea*, perhaps in most cases exclusively, but in one study 8% of diet was freshwater crabs *Dilocarcinus dentatus*. Unsurprisingly in view of habitat-difference, apparently always still-hunts from low perch, not foraging in flight like its congener. Similar method of extracting snail from shell.

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in pairs, sometimes several loosely associated around favoured feeding areas; small parties of up to ten or so may circle together, generally not very high. Circling pairs may call frequently. In aerial displays, one or more may fly straight,

accelerate with rapid beats, then glide before shooting upwards or, alternatively, one may dive down, calling constantly.

**BREEDING** Little known, June-October in Venezuela and Guianas. Smallish flimsy platform of twigs in tree, usually in flooded gallery forest at c14 m on sloping branch or in fork, but a nest in Surinam was at c20 m in diagonal fork of one of several tall kapok trees standing in coffee plantation. Clutch 2 (1-3). Incubation c30 days. Fledging c35 days, though not flying until 40 days.

**POPULATION** Although breeding distribution takes in over 4 million km<sup>2</sup>, this kite is nowhere near as abundant as its congener [29]. Precise habitat requirements of forested land and shallow pools suggest that any population guess above five figures could well be too optimistic. Nevertheless, it remains common enough in many areas, and has shown adaptability to coffee plantations within foraging distance of water where snails are available.

**GEOGRAPHICAL VARIATION** None. Despite obvious affinities with Snail Kite [29], sufficiently different in shape and structure, as well as in habitat, voice and displays, sometimes to be placed in separate genus *Helicolestes*.

**MEASUREMENTS** ♂ wing 265-284 mm, ♀ 272-288 mm; ♂ tail 113-137 mm, ♀ 117-142 mm; ♂♀ tarsus 41-46 mm, bill from feathers 29-35 mm. **Weights** ♂ 377-448 g (five), ♀ 367-485 g (seven).

**REFERENCES** Amadon (1963), Bensinger *et al.* (1988), Blake (1977), Cabot & Serrano (1986), Haverschmidt (1929b, 1968), Hilt & Brown (1986), Mader (1981), Meyer de Schauensee & Phelps (1978), Ridgely & Cowbird (1989), Sick (1993), Thollay (1989b), Voous (1969), Voous & Van Dijk (1975).

## 31 DOUBLE-TOOTHED KITE *Harpagus bidentatus* (Latham, 1790)

Plate 14

**DISTRIBUTION** Neotropical (19°N to 23°S); order 3, rare to fairly common. Much of Central and northern South America: southern Mexico (south and east from Guerrero, Oaxaca, south Veracruz and base of Yucatan Peninsula) through Central America and northern half of South America south to west Ecuador (rare) and, east of Andes, to east Ecuador (also rare), northeast Peru, north and east Bolivia, and much of Brazil (south to eastern Minas Gerais and Rio de Janeiro); also Trinidad (uncommon).

**MOVEMENTS** Apparently sedentary, but some may move from Trinidad to mainland during July-December.

**HABITAT** Humid and wet forest, forest edge (whether open or by coffee plantations), tall secondary growth, open woodland, wooded savannah. Sea-level to 2,100 m, but mostly below 1,200 m and only very locally above 1,500 m.

**FIELD CHARACTERS** Small accipiter-like kite, as adult grey-brown above and variable, often barred, below, with stubby bill, shortish wings, longish tail, and relatively clear RSD; the two tonial 'teeth', formed by notches



on upper mandible, are of little use as field character (see Food). Though sometimes in open on high dead

branches, perhaps particularly when sunning, usually perches inside forest at medium levels or in canopy; not particularly shy, but sluggish and unobtrusive; wing-tips only half down tail. Sexes usually distinguishable; female, averaging 6% bigger, may be up to 15–20% larger and 30% heavier; juvenile quite distinct, differences corresponding to those of some accipiters; as adult after first moult.

**PERCHED Adult** Dusky grey-brown above with bluish-grey head; three whitish bars on blacker tail; white throat, with broad blackish median stripe, and fluffy white crissum; rest of underbody varies from white, more or less washed with rufous and barred with grey (especially males and western populations), to almost solid rufous with faint barring (especially females and eastern populations). **Juvenile** Brown above, variously light-streaked on crown and nape, pale-edged on mantle and coverts; very different below, apart from throat-stripe, being mainly creamy-white with sparse to, more usually, heavy brown streaking (any rufous-buff tinge and rather faint barring confined to flanks and thighs). **Bare parts** Adult eyes orange to orange-red, juvenile paler. Facial skin and cere greenish-yellow. Feet brighter yellow.

**FLIGHT** Small raptor with shortish rounded wings and longish tail, surprisingly like accipiter though wing/tail proportions slightly different and trailing edges of wing-bases slant inwards (not shown on plate); wingspan 2.1 times total length. Fast beats interrupted by short glides; soars regularly, often fairly low above canopy, sometimes at great heights, with flat wings pressed forward, tail usually closed. **Adult** Dark grey-brown above, with three white tail-bars, but fluffy undertail-coverts projecting around base may give impression of white on rump; below, more or less grey-banded white to rufous body contrasts with well-defined white throat (bold dusky median stripe), creamy wing-linings and white crissum, which in turn make white-banded black tail and bold black bands on white primaries stand out. **Juvenile** Browner above with some accipiter-like pale head-streaks, but tail much as adult; underbody mostly creamy with variable but bold streaking (again accipiter-like), some rufous-buff tinge to flanks, and white primaries less boldly banded, but throat, wing-linings, crissum and tail again much as adult.

**CONFUSION SPECIES** Especially in flight, liable to be misidentified as accipiter, of which female Sharp-shinned Hawk [147] and male Bicoloured Hawk [148] comparable in size and geographically variable in plumage; both, however, are shorter-winged, longer-legged, contrastingly capped with fiercer expression, and much shyer and more dashing; neither has median throat-stripe or contrasting white throat, or puffy white crissum; in flight, neither adult shows comparable contrast between rufous or barred underbody and pale throat and wing-linings, and both have straighter trailing edges to wing-bases; both juveniles are more heavily and evenly marked below. Juvenile Rufous-thighed Kite [32] has rufous thighs, less clear throat-stripe. See also Hook-billed Kite [15], Roadside and Broad-winged Hawks [186, 190] and Barred Forest-falcon [261] (all with different shape, no median throat-stripe, etc).

**VOICE** Vocal in breeding season, possibly at other times. Thin high calls, easily missed, resemble those of certain

tyrant-flycatchers (Tyrannidae): hisping *tsip-tsip-tup-tsip-wherrerooip*, drawn-out *wherreroo*, whistled *ser-weereep ser-weereep*, and repeated thin *peeraa...*; also shrill *chieu-ep* or *weoo-weep* and higher single *cheep*. At least these last associated with food-passes and other interactions between pair-members.

**FOOD** Lizards, larger insects (cicadas, crickets); reports of birds caught doubtless due to confusion with accipiters. Often still-hunts from branch beside clearing or at forest edge; or actively forages at medium levels and, perhaps less frequently, in canopy, clambering and hopping about with wings half-open. Habitually follows monkey troupes, bird flocks and, possibly, army ants for potential prey they disturb; may even encourage monkey to move by hovering over and touching it with talons. Takes insects both in flight and from branches or foliage. 'Teeth' presumably used for dismembering.

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in pairs, sometimes several loosely together. Apart from calling in breeding season and brief bouts of single or mutual circling, no displays described.

**BREEDING** In Mexico and Central America nests occupied April–September, but Colombian birds in breeding condition from January. Flattish saucer of sticks and twigs at 6–30 m in fork of usually tall tree; some nests have been at forest edges near coffee plantations. Clutch 1–2 (?). Incubation and fledging periods unrecorded.

**POPULATION** At one French Guianan site, estimated average density at least 15 birds/100 km<sup>2</sup>. No other data on densities, but extensive distribution over more than 10 million km<sup>2</sup> (of which perhaps half includes suitable habitat) makes population of five or even six figures highly possible.

**GEOGRAPHICAL VARIATION** Two races.

*H. b. bidentatus* (South America east of Andes) Averages larger; more or less plain rufous below, with at most fine whitish barring on lower abdomen and flanks.

*H. b. fasciatus* (south Mexico to west Ecuador) Averages smaller; distinctly barred below with white, grey and (especially females) rufous.

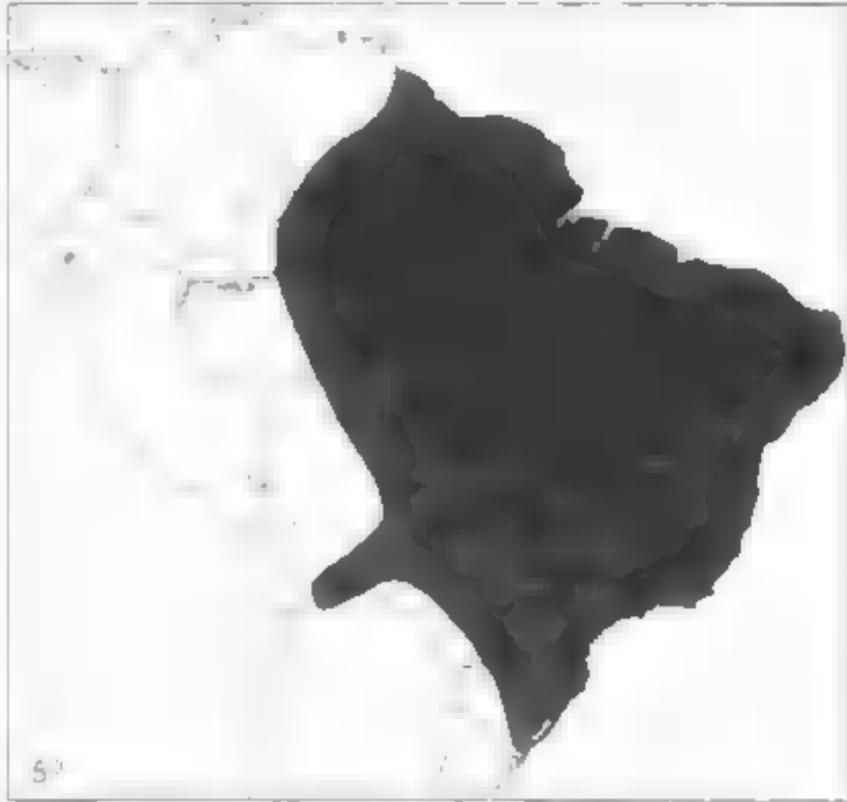
**MEASUREMENTS** *H. b. bidentatus* ♂ wing 192–225 mm, ♀ 204–234 mm; ♂♀ tail 158–170 mm, tarsus 37–43 mm. *H. b. fasciatus* ♂ wing 198–210 mm, ♀ 207–227 mm; ♂♀ tail 141–158 mm, tarsus 41–45 mm. **Weights** *H. b. bidentatus* ♂ 161–185 g, ♀ 196–207 g. *H. b. fasciatus* ♂ 175–198 g, ♀ 190–229 g.

**REFERENCES** Amadon (1961b, 1964), Blake (1977), Boinski & Scott (1988), Boinski & Timm (1985), Cabot & Serrano (1986), Egler (1991), French (1992), Fontaine (1980), Greenlaw (1967), Haverschmidt (1962), Heymann (1992), Hilty & Brown (1986), Howell & Webb (1995), Laughlin (1952), Mader (1981), Meyer de Schauensee & Phelps (1978), Olivares (1962), Ridgeley & Gwynne (1989), Schubert *et al.* (1965), Sick (1993), Skutch (1965), Slud (1964), Sules & Skutch (1989), Terborgh (1983), Thiollay (1985b, 1989b, 1991a), Voous (1969), Wetmore (1965).

**32 RUFIOUS-THIGHED KITE**  
*Harpagus diodon* (Temminck, 1823)

Plate 14

**DISTRIBUTION** Neotropical (6°N to 28°S); order 57; rare to locally fairly common. Northeastern two-thirds of South America: Guyana, Surinam and French Guiana through Amazonia to east Ecuador (Napó), east Bolivia (Santa Cruz), east Paraguay, northeast Argentina (Misiones) and southeast Brazil (south to Rio Grande do Sul, but not recently Paraná).



**MOVEMENTS** Perhaps rather sedentary.

**HABITAT** Forested lowlands, wooded escarpments; often in dense primary forest, but also more open forest (e.g. Brazil) and frequently soars over open areas and tall secondary growth. Sea-level to 1,000 m?

**FIELD CHARACTERS** Small accipiter-like kite, adults slate-grey above and pale below with rufous thighs, with stubby bill, shortish wings, longish tail, relatively clear RSD, and such remarkable resemblance to small male Bicoloured Hawk [148] that mimicry indicated; again, two tomal 'teeth' on upper mandible [cf. 31]. Evidently perches unobtrusively inside forest; wing-tips cover only base of tail. Sexes similar, but female averages 6% bigger and, in extreme cases, difference may be twice that; juvenile distinct, streaked like young accipiter; as adult after first moult.

**PERCHED Adult** Slate-grey above with well-defined blacker head, paler mantle and neck-sides (giving slight collared effect), and some whitish marks showing through on back; two to three greyish-white bars and tip on blackish tail; all plain pearl-grey below but for paler throat with median stripe, rufous thighs, and white crissum. **Juvenile** Blackish-brown above, light-streaked on nape but otherwise any pale edges very narrow; creamy-white below, with dusky throat-stripe and other markings that vary individually on breast and belly from bold blotches to thinner drop-shaped streaks, or bars on flanks, but again contrasting rufous thighs. **Bare parts** Adult eyes red, juvenile paler. Facial skin and cere greenish-yellow. Adult feet yellow-orange to orange, juvenile orange-yellow.

**FLIGHT** Small accipiter-like raptor with shortish rounded wings and longish tail; wingspan almost exactly twice

total length. Fast beats interrupted by short glides; glides on flat wings; flutters and glides in circles looking for thermals to gain height. **Adult** Slate-grey above with darker helmet, wings and tail, paler mantle and tail-bars; below, grey body contrasts with rufous wing-linings, boldly dark-banded whitish flight-feathers, and pale-banded blackish tail behind white crissum; median throat-stripe and rufous thighs should also be fairly clear. **Juvenile** Dark brown above with obscure narrow tail-bars; throat-stripe, crissum, rufous thighs and tail from below much as adult, but rest of underbody creamy with bold dark streaks, wing-linings buff to rufous-tinged with thin shaft-streaks (probably usually invisible), and more thinly banded flight-feathers.

**CONFUSION SPECIES** Adult unlikely to be mistaken for related and similar-sized Double-toothed Kite [31] (greyer head, rufous or rufous-banded underbody darker than plain creamy wing-linings), but juveniles more easily confused (Double-toothed less boldly marked on underbody, with much less rufous thighs, paler wing-linings, plain white secondaries below, whiter tail-bars, and stronger throat-stripe). Both these small kites are accipiter-like in shape and normal flight (though not in their relatively tame and sluggish behaviour) and, with Bicoloured Hawk [148], this resemblance extends to plumage to such a remarkable degree that it must be assumed that the weak kite has evolved mimicry of the strong hawk as protection against predators: smallest male Bicoloured Hawks of the sympatric eastern race *plreatus* are of comparable size, slate-grey above with similar tail pattern and suggestion of collar, and paler grey or brownish-grey below with rufous thighs and white crissum, but, additionally, they have a typically fierce dark-capped accipiter expression, relatively still shorter wings and longer tail, and no throat-stripe. Proportions and lack of throat-stripe also help to distinguish juvenile Rufous-thighed from juvenile Bicoloured, which has less rufous thighs, less drop-shaped streaking below, clearly pale-edged wing-coverts, and different face pattern.

**VOICE** No information.

**FOOD** Few data. Only locusts and other large insects (e.g. cicadas) recorded, but takes some small passerines (M. Pearman) and possibly lizards and frogs. Hunts in middle to lower storeys. Sometimes follows army ants to feed on flushed insects. Other hunting behaviour perhaps similar to that of Double-toothed Kite [31].

**SOCIOSEXUAL BEHAVIOUR** Singly or in pairs. Regularly soars over forest, but no true displays described.

**BREEDING** Only recorded nest, at about 18°S in east Brazil, was built of twigs, lined with leaves, in small tree, and held two eggs in late October. Incubation and fledging periods unknown.

**POPULATION** So little known (probably overlooked) that numbers can only be guessed. Recorded distribution extends over more than 4 million km<sup>2</sup>, and so it seems unlikely that population is under five figures. Only data on densities from French Guiana, where average of at least 4 birds/100 km<sup>2</sup> at one forest site. Continuing deforestation must threaten.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 197–212 mm, ♀ 210–222 mm; ♂♀ tail 135–164 mm, tarsus 57–40 mm. **Weights** No data.

**REFERENCES** Amadon (1961b), Belton (1984), Blake (1977), de la Peña (1992), Navas & Bö (1991), Olrog (1985), Remsen & Traylor (1989), Sick (1993), Snyder (1966), Thiollay (1985b, 1989a–b), Willis (1976).

### 33 PLUMBEOUS KITE *Ictinia plumbea* (Gmelin, 1788)

Plate 13

**DISTRIBUTION** Neotropical (23°N to 29°S); order 6–7; uncommon or fairly common. Central America and northern half of South America: east and southeast Mexico (south Tamaulipas and east San Luis Potosí through Veracruz, northern Oaxaca and Chiapas, and Yucatán Peninsula), Central America, and South America south to west Ecuador and, east of Andes, from Colombia, Venezuela and Guianas down to east Ecuador, northeast Peru, Bolivia, north Argentina (south to Tucumán, Corrientes and Santa Fe), Paraguay and southeast Brazil (Rio Grande do Sul); also Trinidad (where fairly common).



**MOVEMENTS** Sedentary or nomadic in much of South America, but strongly migratory in north of range and to lesser extent elsewhere. Populations from Mexico and most of Central America, also Trinidad, move into unidentified winter quarters in South America east of Andes, mostly in August–September (July–early October), and return north again in February–March. Some resident as far north as Costa Rica, but generally absent from Central America during mid October–mid January. Similarly, southernmost populations in north Argentina, and probably south Paraguay and southeast Brazil, move north during February–September.

**HABITAT** Broken forest, forest edge and other wooded areas, including secondary growth, gallery forest, forest islands in palm savannah and transitional woodland (chaco), but less in solid forest; especially in humid lowlands and near rivers, but extends down to mangroves

and up to forested hills and open pine-clad ridges. Also forages over open country. Sea-level to 2,600 m, but mainly under 1,700 m and probably commonest below 1,200 m.

**FIELD CHARACTERS** Small falcon-shaped kite, mostly slate-grey and blackish with some rufous in wings as adult, with short bill, long wings, squared tail and short legs. Often perches openly on low or high bare branches and dead trees, seemingly oblivious to people nearby, but at times also unobtrusively in cover; wing-tips extend well beyond tail. Sexes similar, and female averages only 2% larger but perhaps 12% heavier; juvenile distinct, but soon more like adult after body moult in first six to eight months.

**PERCHED Adult** Slate-grey head and underbody, apart from paler crown and throat, and blackish around eyes; otherwise blackish-slate above, with paler innermost secondaries and some rufous showing on primaries.

**Juvenile** Basically slaty-black above, but extensively variegated by short whitish supercilia above dusky eye-patches, white edges on rest of head and neck, thinner buff edges on back and wings, and white tips to flight-feathers (which may or may not also show slight rufous wash on primaries); creamy-white below, boldly streaked with blackish. **Immature** Nearly complete body moult in first months produces grey head and underbody flecked with white. **Bare parts** Adult eyes orange-yellow to red; juvenile brown, soon turning yellow. Adult cere blackish-grey, juvenile greenish-yellow. Adult feet yellow-orange to red-orange, juvenile yellow-orange.

**FLIGHT** Small falcon-shaped raptor with long, narrow pointed wings, and medium-length squared or very slightly notched tail; wingspan 2.3 times total length. Leisurely buoyant flight with slow flexible beats, often much gliding and sailing on level wings and, often, spread tail; in soaring, more oval wing-tips curved upwards, noticeably short outermost primary sometimes visible. **Adult** From above, slaty-black with paler head, conspicuous rufous wing-patches and, when tail spread, two thin white bars (rows of white spots) on all but central feathers; from below, mainly grey with whiter throat, more extensive and paler rufous wing-patches, and two-banded blackish tail. **Juvenile** Blackish above with extensive pale edgings, particularly on head, and three indistinct tail-bars; latter more obvious from below, where whitish body more clearly streaked than mottled wing-linings, and where variegated primaries (whitish-based, more or less rufous-tinged in middle, and darkest near white tips) contrast with white-tipped but otherwise uniformly brown secondaries.

**CONFUSION SPECIES** High risk of confusion with related Mississippi Kite [34] (which overlaps on passage through Central America and while wintering in South America October–March, and has now also been found

breeding in Bolivia: see Davis). When perched, adult Mississippi has paler head, underbody and secondaries, and wings project only just beyond tail; but these features of limited or no use in flight overhead, when it is also difficult to be sure that there is little or no rufous in the wings or that the tail is plain (presence of strong rufous wing-patches and white tail-bars on Plumbeous can be easier to determine than their virtual absence on Mississippi); this is further complicated by subadult Mississippi, which, completing body moult in winter quarters but not wing moult until later, do not have paler secondaries. Juveniles also difficult to separate, though Mississippi browner above, streaked rufous (not blackish) below, and, in flight, has less complete tail-bands and more uniform primaries [plate 13]. Both juveniles also show some similarities in size, wing/tail proportions and colour of upperparts to juvenile White-tailed Kite [24] (whiter face, darker shoulders, paler tail with subterminal band and, from below, much paler with black carpal patches).

**VOICE** Usually silent except when breeding. Two- or three-syllabled mournful whistle, dropping at end: *wee-wee-wee* or *see-order* (recalling Piratic Flycatcher *Legatus leucophatus*). Shrill *shirrrrrer* or *sisserroo*. Also *hee-hi hee-hi, jip-jip*.

**FOOD** Primarily insects, but also, perhaps more when feeding young, mainly arboreal lizards, snakes, frogs and (rarely?) snails. Insects either large (dragonflies, beetles, locusts) or swarming (ants, termites, bees); over 200 seen hawking emerging flying ants in Venezuela (M Pearman). Frequently forages on wing, circling and swooping or transect-flying above canopy or along forest edge, sometimes with feet dangling; but also still-hunts from open perch. Often crepuscular. Catches flying insects in one or other foot (it has been suggested that small swarming species may also be taken in open mouth) and eats them in flight; also snatches cicadas and other large insects, as well as small reptiles and frogs, from foliage. During mass-emergences of large-bodied cicadas in wet season, pairs may spend several hours a day closely accompanying troupes of marmosets *Callithrix* to capture the cicadas they disturb (cf. Grey-headed Kite [14]). Attracted to burnt areas, where catches small reptiles on ground. Has been stated also to swoop down to seize injured birds.

**SOCIOSEXUAL BEHAVIOUR** Gregarious on migration, commonly in flocks of 70–100 (even several hundreds) in Panama, but usually not more than 40–50 in Argentina, and often associating with Swallow-tailed Kite [21].

Also feeds socially in parties of 5–10, occasionally much larger numbers (see Food). Little or no aerial courtship apart from mutual circling and some calling.

**BREEDING** Season March–August in north of range, February–June in Trinidad, January–May and/or July–October in equatorial regions, and September–February in north Argentina and southeast Brazil (Rio Grande do Sul). Nest of twigs varies from flimsy and shallow to bulky and relatively deep (through re-use?), at 10–50 m in main fork or out on side branch of tall tree (sometimes leafless) or mangrove. Clutch 1–2. Incubation 32–33 days. Fledging c30 days. Possibly double-brooded in equatorial regions?

**POPULATION** Often easily seen and, in South America, generally common enough. Average density at least 9 birds/100 km<sup>2</sup> at one site in French Guiana. Breeding range encloses more than 14 million km<sup>2</sup>: even were the habitat suitable in just half of that, and each breeding pair was to need 10 km<sup>2</sup>, the total adult population would exceed 1 million. Since 'flocks of up to several hundreds' pass through Panama each spring and autumn, generally a month earlier than the Mississippi Kites [34], the population of southeast Mexico and Central America alone seems likely to be of at least five figures, and the species is generally commoner in the other nine-tenths of the range. It adapts well to secondary growth and seems unaffected by felling and other disturbance that does not directly threaten it.

**GEOGRAPHICAL VARIATION** Monotypic. Sometimes suggested (e.g. Sibley & Monroe, Smith) that this and the totally migratory Mississippi Kite [34] of southern USA may be conspecific; clearly they are allospecies, but with significant differences in wing-formula, wing/tail proportions, tail shape, and plumage; they also mingle on migration and in non-breeding quarters without lasting confusion.

**MEASUREMENTS** ♂ wing 270–313 mm, ♀ 274–321 mm; ♂♀ tail 123–167 mm, tarsus 34–43 mm. **Weights** ♂ 190–267 g (five), ♀ 232–280 g (six).

**REFERENCES** Belton (1984), Blake (1977), Contreras *et al.* (1990), Davis (1989), de la Peña (1992), Eisenmann (1963a), Ferrari (1990), Fjeldså & Krabbe (1990), Haverschmidt (1962), Hilty & Brown (1986), Howell & Webb (1995), Marroquin *et al.* (1992), Meyer de Schauensee & Phelps (1978), Monroe (1968), Olrog (1985), Ridgely & Gwynne (1989), Russell SM (1964), Sick (1993), Skutch (1947), Slud (1964), Smith (1985), Stiles & Skutch (1989), Sutton (1944), Terborgh & Weske (1975), Thiollay (1989a), Voous (1969).

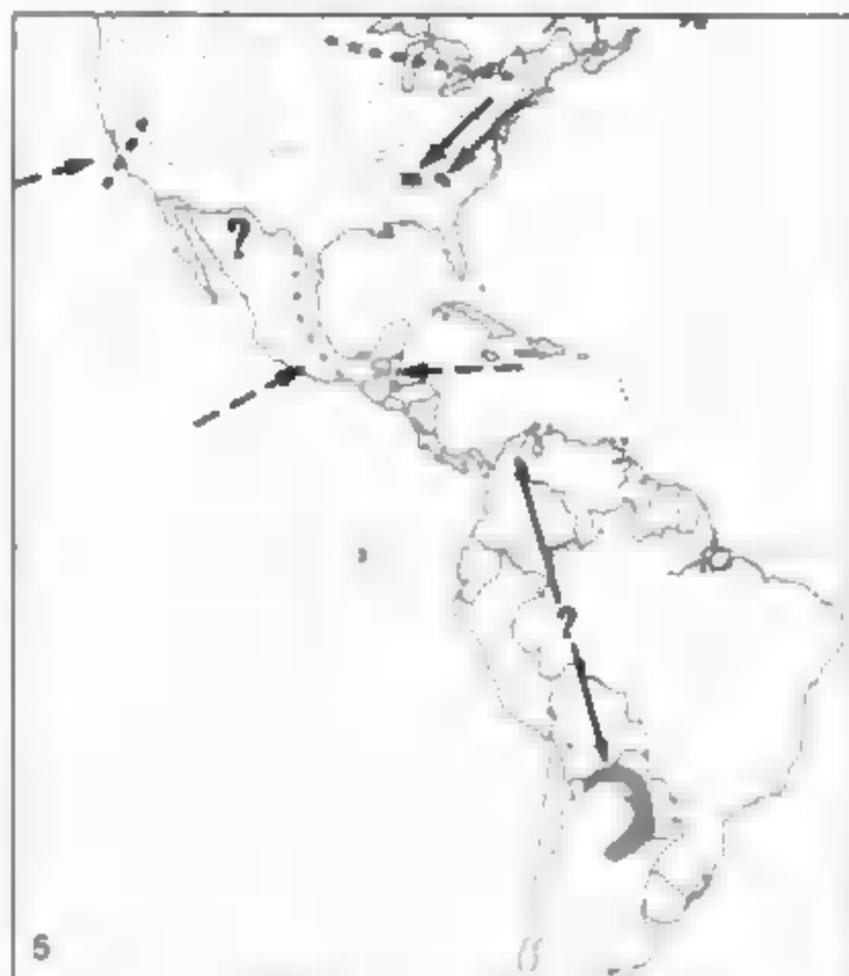
## 34 MISSISSIPPI KITE

*Ictinia mississippiensis* (Wilson, 1811)

Plate 13

**DISTRIBUTION** Nearctic (38°N to 29°N) and, in winter, Neotropical (at least 18°S to 32°S); order 5; locally common, and increasing. Breeds patchily in southern USA and, perhaps, extreme north Mexico: from central Arizona, New Mexico and north and west Texas (possibly extending to northernmost Chihuahua and Coahuila), Louisiana, Mississippi and north Florida north to

southeast Colorado, central Kansas, southeast Missouri, south Illinois, west Kentucky, west Tennessee, Alabama, Georgia and North Carolina. Probably winters mainly Paraguay and adjacent parts of southeast Bolivia and southwest Brazil; has been recorded in five provinces of northeast Argentina (south to Córdoba), but only in very small numbers.



**MOVEMENTS** Highly migratory, with latitudinally restricted breeding area and apparently hardly less limited winter quarters separated by some 6,000 km. Leaving USA late August–early September, passes through Central America and September–early November (peaking one month later than Plumbeous [33], though sometimes migrating together); little known in South America, but possibly moves direct down east side of Andes (not recorded in west, or to east of Colombia), arriving Paraguay and north Argentina from October until February; returns through Panama and Costa Rica mid March–mid April (early May). Peaks of passage counted through Isthmus of Panama have included 8,011 in one day and 27,452 in one autumn. (Unknown in West Indies, so no evidence of the alternative island-hopping route south from Florida ever being used.) At migration times, vagrants north to Minnesota and west to California.

**HABITAT** Very varied from open grassland to extensive forest, though typically riverine forest, open woodland, parks, grassland with shelterbelts; sometimes common in human-influenced habitats, such as agricultural land, and even some towns. Sea-level to 1,200 m.

**FIELD CHARACTERS** Small falcon-shaped kite, black, grey and whitish as adult, with short bill, long wings, notched tail and short legs. Perches both openly, on bare branches and dead trees, and more unobtrusively in cover; wing-tips extend just beyond tail. Sexes rather similar, and female averages only 4% larger but perhaps over 30% heavier; juvenile distinct, but more like adult after body moult in winter quarters during first six to eight months.

**PERCHED Adult male** Whitish to grey-white head but for black around eyes; whitish secondaries stand out against slate-grey back and wing-coverts, and blackish tail and primaries (any touch of rufous visible only at closest range); whole underparts paler grey. **Adult female** Similar but for slightly darker whitish-grey to pale grey head. **Juvenile** Dark brown above, edged rufous on back and

wing-coverts, and tipped whitish on flight-feathers and tail; whitish streaks on crown and nape; short buff supercilia, and greyer secondaries; all creamy below, boldly streaked with dark rufous from chest downwards.

**Immature (first-summer)** After body moult in winter quarters, more like adult by time of return north, but distinguished by worn brownish flight-feathers and tail without contrasting pale secondaries; grey of body usually also sullied by odd remaining juvenile leathers and some whitish bases showing through. **Bare parts** Adult eyes red; juvenile brown, turning reddish; first-summer reddish. Adult cere blackish, juvenile greenish-yellow to yellow. Adult feet orange-red, juvenile orange-yellow.

**FLIGHT** Small falcon-shaped raptor with long, narrow pointed wings, and notched tail becoming triangular when spread; wingspan 2.3 times total length. Leisurely buoyant flight with slow flexible beats; much gliding and sailing to and fro on level wings and, often, spread tail; in soaring, rounder wing-tips curved upwards, noticeably short outermost primary sometimes visible. **Adult** From above, pale grey or whitish head and secondaries stand out from dark grey back and forewings, and from blackish primaries and plain tail; from below, predominantly grey with paler head, darker primaries, white-tipped secondaries, uniformly blackish tail. (Any rufous on primaries virtually invisible in field, with far less show-through than on Plumbeous [33].) **Juvenile** Dark brown above, with whitish and rufous streaks and edgings; from below, creamy body with dark red-brown streaks stands out from pale brown mottled wing-linings and more uniformly dark flight-feathers, which have white tips and sometimes small whitish area at base of outer primaries; from below, tail usually shows 2–3 variably complete narrow whitish bands, but sometimes plain. **First-summer** Body much as adult, but retains worn juvenile flight-feathers and tail (no white tips) and, variably, wing-linings.

**CONFUSION SPECIES** Unmistakable in USA, where White-tailed Kite [24] is nearest (but adult body and tail white, shoulders and carpal patches black; juvenile face and tail whitish, latter with subterminal band, shoulders blackish, underparts mainly white with carpal patches). Some resemblance in outline to Peregrine Falcon [309] (but plumage and flight very different). When in Central and South America, however – see Movements – serious risk of confusion in all plumages with much commoner Plumbeous Kite [33] (which see).

**VOICE** Usually silent except near nest. Then common call a high, thin double whistle, *phoo-phoo* (first syllable rising, second downsturred). Pairs may also chatter at each other in flight, but in general this species seems less noisy than Plumbeous Kite [33].

**FOOD** Primarily large insects (dragonflies, grasshoppers, cicadas, katydids, beetles); also smaller swarming insects, and mice, amphibians, small reptiles; probably bats and, once, a fish. Forages mainly in flight, leisurely gliding about to catch and eat insects on wing, or still-hunts like flycatcher from exposed perch, returning there to feed. At times flies low over grassland, snatching grasshoppers or mice, or follows cattle or horses for insects they disturb; also picks insects and lizards from foliage.

**SOCIOSEXUAL BEHAVIOUR** Usually social at all times, often breeding in loose colonies of up to 20 or more

pairs, feeding in small groups of up to 15 or so, and roosting and migrating in larger flocks, sometimes of 200–300 or more (though migrant parties usually 10–40). Little or no aerial courtship apart from mutual circling and chattering.

**BREEDING** Season April–May–August. Loosely colonial. Nest of twigs varies from small and flimsy to more solid, 20–40 cm across and 10–15 cm deep, or adapted from old nest of crow or other bird, lined with green leaves; at 3–35 m in fork of wide variety of trees from small scrub oak to, less commonly, tall pine or cottonwood. Clutch 2 (1–3). Incubation c30 days. Fledging c34 days.

**POPULATION** As 27,000+ have passed through Panama in one autumn, the population is clearly well into five figures. The breeding range covers 1.5 million km<sup>2</sup>, and if, say, 15,000 of those migrants were adults (the rest being juveniles) that would give a density of 1 pair/200 km<sup>2</sup>, which is probably far too low. In linear habitats nests may be as little as 125 m apart, and one Kansas forest area of under 4 km<sup>2</sup>, surrounded by prairie, held 30–75

pairs, but this species is patchily distributed in isolated colonies. Currently increasing in both numbers and range.

**GEOGRAPHICAL VARIATION** Monotypic. (But see Plumbeous Kite [33].)

**MEASUREMENTS** ♂ wing 286–305 mm, ♀ 300–315 mm; ♂♀ tail 149–172 mm, tarsus 35–41 mm. **Weights** ♂ 216–269 g, ♀ 278–339 g.

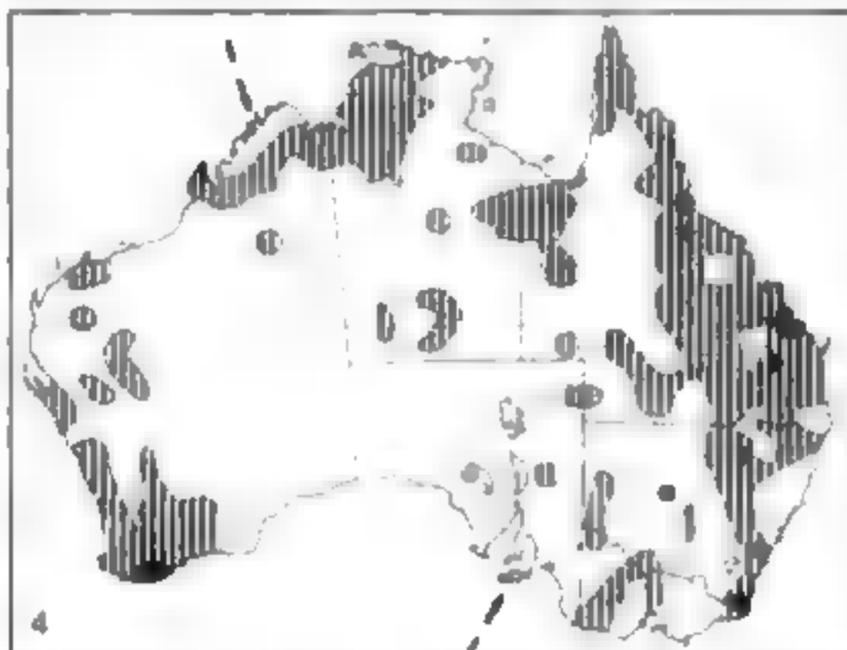
**REFERENCES** Blake (1949, 1977), Bolen & Flores (1993), Botelho *et al.* (1993), Clark & Wheeler (1987), Contreras *et al.* (1990), Cranon (1972), Davis (1989), de la Peña (1992), Eisenmann (1963), Fitch (1963), Flieg (1972), Friedmann (1950), Gennaro (1988), Gliniski & Gennaro (1988), Gliniski & Ohmart (1983), Hardin *et al.* (1977), Hody & Brown (1986), Howell & Webb (1995), Johnson (1990), Kalla & Abop (1983), Love *et al.* (1985), Lynch (1981), Meyer de Schauensee & Phelps (1978), Mouton (1968), Palmer (1988), Parker (1976, 1977), Parker & Ogden (1979), Parker & Ports (1982), Ridgely & Gwynne (1989), Robinson (1957), Shaw & Maxwell (1988), Sick (1993), Skinner (1962), Slud (1961), Smith (1986), Smith (1985), Snyder & Snyder (1991), Sutton (1939, 1944), Sweet (1986, 1991), Taylor (1964), Thiollay (1997d, 1980a), Wheeler & Clark (1995).

## 35 SQUARE-TAILED KITE *Lophoictinia isura* (Gould, 1838)

Plate 11

Other name: Long-winged Kite

**DISTRIBUTION** Australasian (10°S to 40°S); order 4; generally scarce to rare. Endemic to Australia; mainly in coastal and subcoastal areas, absent from treeless interior; perhaps only non-breeding visitor north of 18°S.



**MOVEMENTS** Present all year in east and, probably, much of west, but seasonal movements to north and south; largely absent from Victoria and from southern parts of South Australia and New South Wales during austral winter, which is time of most records in northern parts of Western Australia, Northern Territory and Queensland.

**HABITAT** Open sclerophyll forest and woodland, typically of eucalyptus and angophora, also hunting over nearby scrub, heathland and crops; timbered watercourses and wooded foothills and gorges farther inland; more locally, rainforest edge and clearings and recently, in east, well-vegetated fringes of urban areas. Bird of tree tops and outer canopy. Sea-level to 1,000 m.

**FIELD CHARACTERS** Large, slim, aerial kite, mostly brown and rufous as adult, with smallish head, slender bill, slight occipital crest, short legs, small feet. Usually quite approachable; perches openly on trees, or within cover, tending to lean forward; seldom on ground; wing-tips extend well beyond longish tail. Sexes similar and female only 0–8% larger, but perhaps up to c25% heavier; juvenile easily distinguishable; probably not fully adult until third year, having, unusually among kites, passed through clear immature stage (cf. Black-breasted Kite [36]).

**PERCHED Adult** Conspicuous creamy forecrown and face, and dark-streaked rufous nape and underparts (streaking heaviest on chest); mainly dark brown above, apart from pale panel across central wing-coverts and longer scapulars; obscurely barred grey-brown tail. Cere and feet whitish (not yellow) in all plumages (cf. Black Kite [39]). **Juvenile** Less striking, lacking creamy face; head and underbody rufous with fine dark streaks; brown above with bold rufous feather-edges, these so broad on median and some lesser wing-coverts as to form mainly rufous panel; tail very obscurely marked. **Immature (second to third year)** Intermediate; darker and less rufous above than juvenile, with paler (but not white) forecrown and face, and more streaked underbody. **Bare parts** Adult eyes pale yellowish-hazel, juvenile brown. Adult cere and feet flesh-white, juvenile feet more creamy.

**FLIGHT** Medium-sized dark raptor, similar in size to other larger Australian kites [39–41], but smaller head and slimmer body; proportionately longer and narrower wings look broadest near tips, which have longer and more fingered primaries, and longish tail may be squared or single- or double-notched; wingspan over 2.5 times total length. Buoyant and agile, with loose shallow beats, though sometimes deeper and more fluid with rowing action; long periods of sustained gliding (seldom

flapping) on raised wings, rather harrier-like though with carpals thrust forward and well-spread tips angled back, dihedral constantly altering and tail often twisted or spread; sometimes rocks while gliding (cf. Black-breasted Kite [36]) or jinks between crowns of trees; also soars with wings in shallow V. **Adult** Mainly dark above but for creamy forepart of head, pale diagonal wing-panel, sometimes paler lower back and rump; flight-feathers and tail greyer-brown with dark terminal band, but other barring obscure except on splayed primaries, bases of which also form pale window on each wing; from below, these finger-bars and whitish windows much more conspicuous, together with bold black carpal arcs; white face again obvious, body and wing-linings dark-streaked rufous; greyish secondaries and tail both have faint bars, broad terminal band. **Juvenile** Apart from lack of creamy face, similar pattern below, though much finer streaking very inconspicuous, and barring and terminal bands on secondaries and tail less clear; from above, pale greyish wing-diagonal replaced by rufous. **Immature (second to third year)** Intermediate: see preceding paragraph.

**CONFUSION SPECIES** Black Kite [39] sometimes unnecessarily mistaken for juvenile but, while both have pale wing-diagonals, whitish windows, paler head and more or less rufous underbody, and either can show notched or almost straight-ended tail, Black is social scavenger with very different behaviour and wing shape, flat or bowed wings when gliding, black (not barred) primaries, no dark terminal quill-bands or carpal patches, and yellow cere and feet. May also be confused with juvenile Black-breasted Kite [36] (more like eagle than harrier, more thickset, with obviously larger head, bill and feet, evenly broader wings, shorter black primaries, clearer windows, plain secondaries, shorter unmarked tail); Red Hawk [156] (again more thickset, with larger head and bill, massive legs and feet, shorter and more pointed wings without windows or carpal arcs, quicker flapping flight, flat glides); rufous adult or pale juvenile Little Eagle [231] (similarities in flight pattern, but very different shape and actions, with much larger bill and feet, legs fully feathered, no dark carpal crescents below); and Australasian Marsh Harrier [101] (similarities in flight action, but flaps more frequently on narrower-tipped wings with no pale diagonals above or clear carpal arcs below, rounded tail, long legs).

**VOICE** Generally silent except near nest; even then calls infrequent and, except in aerial displays, mostly from female. Main sounds yelping in quality: short hoarse yelp ending in rattle, *ok-ak*, repeated at one-second intervals and recalling cackle of Brown Falcon [274] (by both sexes in display-flights and territorial defence); clear plaintive yelp, *keetae, keetae*, repeated at two-second intervals (by soaring male during interaction with another raptor and, more softly, by female approaching nest with food); and high-pitched hoarse or wheezing yelp, *yip-yip-yip...* (by both sexes during mutual high-circling, and in various contexts at nest by female when may also be extended into longer yelps, *rep-cep-cep...*). Other calls include hoarse wheezing squeals (by begging female and, more slowly, by copulating male), brief shrill chitter (by female at nest), and richer, almost chortling chitter in short bursts at c one second intervals, sometimes becoming low throaty rattle (by male arriving at nest).

(Male's voice said to be lower than female's, though this would be reverse of norm.)

**FOOD** Wide range of smallish items, including insects and birds' eggs and nestlings, also full-grown small birds, tree frogs, lizards and at least some snakes, mice, and young rabbits; not carrion. Insects include grasshoppers, crickets, beetles, stick insects, mantids and ants. Most prey taken from outer foliage, some from ground. Forages almost entirely on wing, by slow sustained quartering low over canopy or, sometimes, ground vegetation, or by transect-hunting along tree-lined creeks, wooded edges or other interfaces, or by circling over forest clearings; can also hang motionless in strong breeze for up to 20 seconds. Drops down, sometimes with wings in strong dihedral, to snatch prey from foliage, even crashing into canopy. One report of hunting from open perch, with subsequent flight into nearby tree foliage, where landed on dove's nest. Domed bird nests robbed by balancing on tree or bush with raised or outstretched wings and either thrusting bill through entrance or tearing structure apart with foot. May sometimes locate nests by calls of nestlings. Catches birds flushed from forest canopy or ground, or even put up from road by motor vehicle, but any subsequent tail-chases usually unsuccessful. Attracted to bush fires, probably mainly for insects, which sometimes caught in flight. Seen feeding on ground during grasshopper plague, and walking around small waterhole, but otherwise seldom alights on ground (cf. Black Kite [39]) and then only briefly, moving most awkwardly. Some small prey items eaten on wing, most taken to tree perch.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary, but sometimes pairs or family parties of three or four; most reports of larger numbers due to misidentification of Black Kites [39] or to Square-tailed associating with them or Whistling Kites [40], but one record of five returning migrants together in spring. Mutual or single high-circling common, and presumed male sometimes chases or dives at mate, who may then roll or tumble. Only descriptions of undulating sky-dance relate to single birds repeatedly swooping on half-closed wings and rising again. When soaring female attacked by Black Falcon [302], her mate appeared overhead and stooped at intruder, which departed while female drifted away; male then spiralled up to perhaps 1,000 m, where he circled with continuous shallow, fluttering beats while uttering rapid *re-re-re...* squeal, before gliding at great height into distance. Aerial displays may or may not be accompanied by yelps (see Voice).

**BREEDING** Mainly June–December in Queensland and September–January in southern states. Large stick nest 50–85 cm across and 25–60 cm deep or up to c1 m across and 75 cm deep, sometimes based on old nest of another raptor, lined with green leaves; in thick horizontal fork at 8–34 m in eucalyptus, angophora or other large tree, in inland areas usually within 100 m of watercourse. Clutch 2–3. Incubation c37–42 days. Fledging 59–65 days, with dependence for further month or more.

**POPULATION** Most data on density have involved either distances between two or more nests or measurements of linear habitats based on riverine gullies; these have all been 5–20 km. Thus, the one generalised estimate of home range at 100+ km<sup>2</sup> may be not unreasonable;

another pair in New South Wales ranged over 50 km<sup>2</sup> in one morning. Limits of breeding distribution enclose 2–3 million km<sup>2</sup>, but broadly coastal and subcoastal, extending well inland only along timbered watercourses, and, as generally rare to uncommon, population perhaps more likely to be in upper thousands than five figures. This kite's 'specialised feeding ecology, apparently specific hunting and breeding habitat requirements and low density suggest it may be sensitive to climatic change and variation in food supply, and possibly threatened by the habitat destruction that has occurred and is continuing...'; even so, 'loss of habitat may be offset to some extent by the creation of suitable openings in formerly extensive forest...' (Debus & Czechura). Adverse effects of habitat loss, and illegal taking of its eggs, also partly countered by its recent adaptation to well-vegetated suburban fringes in subtropical east Australia, where it feeds on plentiful passerines.

**GEOGRAPHICAL VARIATION** Monotypic. (Although, as here, usually treated as primitive kite related to *Mibius*, now considered by some authorities to form part of a distinct Australasian clade: p. 69.)

**MEASUREMENTS** ♂ wing 445–478 mm, ♀ 460–499 mm; ♂ tail 238–260 mm, ♀ 241–280 mm; ♂♀ tarsus 46–60 mm. **Weights** ♀ 600–680 g (three), juvenile ♂ 501 g (one), juvenile ♀ 590 g (one).

**REFERENCES** Binns *et al.* (1991), Blakers *et al.* (1984), Cameron (1976), Cameron (1992), Cuppet & Cuppet (1981), Dab & Evison (1996), Debus (1991a, 1993a, 1996a, b), Debus & Czechura (1989, 1992a), Debus & Silveira (1989), Debus *et al.* (1992, 1993), Fraser (1993), Garnett (1992), Garnett *et al.* (1994), Hollands (1984), Johnston (1983), Marchant & Higgins (1993), Noakes (1988), Olsen & Marples (1993), Olsen *et al.* (1993), Schodde (1993), Schodde & Tiedemann (1988), Schulz (1983).

## 36 BLACK-BREASTED KITE *Hamirostra melanosternon* (Gould, 1841)

Plate 11

Other names: Black-breasted Buzzard, Black-breasted Buzzard-kite

**DISTRIBUTION** Australasian (10°S to 37°S); order 4; widespread but often rare, commoner in north. Endemic to Australia, but absent southwest, southeast and extreme east; some withdrawal during 19th and early 20th centuries from southeast.



**MOVEMENTS** Adults largely sedentary where conditions permit, but nomadic in severe drought; some breeding areas then deserted until repopulated by wandering juveniles if and when conditions favourable again. Annual movement between interior grassland and coastal forest in tropical Queensland may similarly relate to drought. But some regular seasonal south-north migration also evident; most records south of 31°S relate to breeding season and these and some inland populations possibly winter in north, where species may be non-breeding visitor to Top End of Northern Territory (some do nest there) and islands in Torres Strait.

**HABITAT** Essentially arid zones: open sclerophyll forest and eucalyptus woodland, thinly timbered dry savannah, scrub-steppe, dry heathland and completely open

country from arid grass plains to sandy desert, though then needs timbered watercourses, woodland clumps or shelterbelts for nesting. Often forages in desert and grassland, where rests on ground. Sea-level to 1,000 m.

**FIELD CHARACTERS** Large, robust, rufous and blackish kite, something like small eagle in build, with long though fairly slender bill, bulbous cere, prominent head, slight occipital crest, and powerful (unfeathered) legs, but weak kite-like toes. Perches openly or within canopies, rather less upright than most kites and looking heavy-bodied (twice weight of Square-tailed [35] and at least 50% heavier than Black [39]); also spends much time on ground, standing, squatting, sunbathing, or walking easily with horizontal stance; long wings extend clearly beyond tip of short tail. Sexes similar and mean female size only 2% larger (maximum 9%), though perhaps 10–15% heavier; juvenile distinct, probably not fully adult until fifth year, having, unusually among kites, clear immature stages (cf. Square-tailed).

**PERCHED Adult** Black forehead, face, breast and mantle, and rufous-scaled black back and scapulars, contrast with almost plain rufous nape, lower abdomen and thighs, and browner wings with largely rufous shoulders. At all ages, tail grey-brown, cere and feet whitish. **Juvenile** Whole head and underparts rufous with blackish streaks on crown, nape, throat and, most obviously, chest, and blackish-brown back and all wing-coverts with broad rufous feather-edges forming still more extensive rufous shoulders. **Immatures (second to fourth years)** Become browner, less rufous, with broadening streaks on breast and increasing black areas: black forehead and face in third year, but no solid black on breast until early in fourth. (Some nest in second or early third year and these formerly identified as 'pale-morph' adults.) **Bare parts** Adult eyes brown, juvenile and immature paler hazel until at least third year. Cere and feet flesh-white.

**FLIGHT** Medium-sized dark raptor, comparable in size to other larger Australian kites [35, 40–41], and bigger

than Little Eagle [231], with proportions rather different from all: combination of prominent head, thickset body, long and rather evenly broad wings, and short squared (in fact, slightly double-notched) tail becoming more rounded with wear; wingspan over 2.5 times total length. Buoyant and agile, with usually powerful rowing action, but faster shallower beats in pursuit; long periods of low gliding, hardly ever flapping, on modified dihedral (arms raised, hands flutter and somewhat backswept); angle of arms varies to considerable extent and, characteristically, bird rocks from side to side while sailing majestically along (cf. Bateleur [73]); also soars for long periods on raised wings. **Adult** Mainly dark above, but for rufous nape and forewings, and conspicuous whitish windows at bases of primaries; these windows even more obvious from below as clear white translucent patches standing out against black wing-tips, dark carpals and uniformly greyish secondaries; head and breast black, abdomen rufous, wing-linings paler rufous and mottled black, and tail grey. **Juvenile** Longer-tailed and much more rufous; similar black primaries with creamy basal windows, and greyish tail (plain) and secondaries (very faintly barred); otherwise blackish-brown back and upperwing-coverts with broad rufous scalloping, and rufous head, wing-linings and underbody most obviously streaked on chest. **Immatures (second to fifth years)** Intermediate: see preceding paragraph.

**CONFUSION SPECIES** Adult almost unmistakable. As size intermediate between two Australian eagles, wing shape and sighting of white at base of primaries might cause temporary confusion with distant Wedge-tailed Eagle [225] (some white on underwings, but otherwise mainly blackish with secondaries and long wedge-shaped tail all barred greyish) or dark-morph Little Eagle [231] (duller, with pale upperwing-panels, indistinct windows, barred secondaries, longer tail, feathered legs, soars on flat wings). Juvenile more confusable, especially with other immatures. Juvenile pale-morph Little Eagle has additional similarities, including rufous body and forewing-linings and clearer white wing-patches, but, apart from differences already mentioned, also broad whitish underwing-diagonals. Juvenile Square-tailed Kite [35] slenderer, with smaller head, bill and feet, thinner wings relatively broad towards tips, long barred fingers, longer tail, pale upperwing-diagonals, and dark carpal arcs below. Red Hawk [156] has shorter and more pointed wings without windows or carpal arcs, barred primaries, longer barred tail, massive feet, quicker flapping flight, flat glides. Juvenile Brahminy Kite [41], with shorter rounded wings, less contrasted windows, dusky linings, and rounded tail, also glides on flat wings.

**VOICE** Often silent, apparently even in aerial courtship, but noisy in interaction with other species. Main distress call when mobbed by large passerines or smaller raptors in flight, or when attacking other raptors or crows entering nest area, is repeated hoarse yelping *yik-yik*; this and sometimes long, thin whistled scree of alarm also directed at human intruders. During nest-building, one pair used piping *yip-yip* when arriving at site before collecting more material; and female uttered long rasping *scarp* as prelude to allopreening by male.

**FOOD** Mammals, birds, also lizards and small snakes, some insects, and roadkills, carcasses and other carrion.

Mammals especially rabbits and small rodents, even juvenile kangaroos. Birds up to size of pigeons, parrots, even ducks; nest contents (even Black Kite [39] and Australian Kestrel [282]) and, notably, eggs of large ground-breeders, including Emu *Dromaius novaehollandiae*, Magpie Goose *Anseranas semipalmata*, Brolga Crane *Grus rubicunda* and Australian Bustard *Ardeotis australis*, as well as of colonial terns. Most prey taken on ground, some birds and nest contents, perhaps also lizards, snatched from trees. But forages almost entirely on wing, mainly by sustained and deceptively fast transect-sailing at low to medium heights across open ground or at tree-top level through open forest or along timbered creeks; also, at various heights, transect-hunts or quarters with harrier-like beats and glides. When prey seen, swoops down or tail-chases. Some reports of co-operative hunting. Any still-hunting from perch probably casual opportunism, but sometimes searches on ground for arthropods, birds' eggs, small carrion, or reptiles in crevices. Smaller eggs broken with bill, or picked up and dropped, but use of stones to crack eggs of Emu and other large ground-nesters now firmly established; kite drives sitting bird off by threat with open wings, then stands and tosses stones rather haphazardly with bill (cf. Egyptian Vulture [54]); but no confirmation yet of old reports of stones dropped in flight on to eggs.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, but up to ten or so may gather at carrion, at nests of large terrestrial birds (see Food), or at communal roosts. On rare occasions polyandrous, possibly when second male needed to help provide enough food. Aerial displays include mutual circling above nest site and high-circling over much wider areas: these activities presumed to serve courtship and territorial functions respectively. During mutual circling, higher bird may stoop at mate, who may then roll over and touch claws. Undulating sky-dance involves series of dives and upward sweeps, without any wing-flapping and apparently in silence: in one case male made three successive switchbacks while female flying below, diving from height of 45 m to 15 m with wings open and talons down, then seeming to halt momentarily with feet lowered before climbing vertically to original height, slipping over and diving again. Two locking claws and cartwheeling in probable territorial dispute also recorded more than once.

**BREEDING** Lays late winter and spring, so extreme season June/July–January. Large stick nest 70–150 cm across and 40–90 cm deep, lined with green leaves, at 6–22 m in main fork of tall and often dead tree, generally about halfway up; perhaps occasionally (not proven) on rock face. Clutch 1–2 (1–3). Incubation 36–40 days. Fledging 56–60 days, with dependence for 2+ months. (Unusually, both sexes apparently take roughly equal shares in incubating, brooding, and hunting.)

**POPULATION** Less peripheral than many Australian raptors in arid interior, and distribution limits enclose over 5 million km<sup>2</sup>, but often rare and breeding usually dependent on linear habitats of timbered watercourses: even there, many may not nest in drought years. Distances between four to six nests along one 50-km stretch in northeast South Australia during 1976–85 averaged about 10 km (6–14 km); records elsewhere have included nests 5.5 km and 8 km apart, three nests

in 10 km, and another three in 20 km. Four-figure population estimate may be on low side. Nevertheless, like Square-tailed Kite [35], remains scarce with sensitive habitat and climatic requirements. Vulnerable to spreading development, and has declined significantly in east and southeast, probably through habitat destruction and disturbance, locally also through egg-collecting and perhaps poisoning of carcasses. Strongholds in tropical savannahs threatened by overgrazing which, combining with severe drought to cause desertification, could result in local extinctions.

**GEOGRAPHICAL VARIATION** Monotypic. (Although, as here, usually treated as primitive kite related to

*Mitvus*, now considered by some authorities to form part of a distinct Australasian clade: p.69.)

**MEASUREMENTS** ♂ wing 437–463 mm, ♀ 440–490 mm; ♂ tail 201–208 mm, ♀ 183–224 mm; ♂♀ tarsus 63–69 mm. **Weights** ♂ 1.15–1.24 kg (two); captive ♀ increased from 1.21 kg as immature to 1.45 kg as well-fed adult.

**REFERENCES** Angus (1992), Aumann (1980a), Baker-Gabb (1990), Blakers *et al.* (1984), Copper (1977), Copper & Copper (1981), Debus (1991b, 1992), Debus & Czechura (1992b), Garnett (1992), Hollands (1984), Marchant & Higgins (1993), Olsen & Muplex (1993), Olsen *et al.* (1993), Pepper-Edwards & Notley (1991a–b), Schodde (1993), Schodde & Tidemann (1988).

## 37 RED KITE *Mitvus mitvus* (Linnaeus, 1758)

Plate 7

**DISTRIBUTION** Endemic to west Palearctic (59°N to 33°N); order 5+; marked declines in range and numbers since 18th–19th centuries, but still locally common and in few areas increasing again with protection and even some reintroduction (see Population). Now almost certainly confined to west and central Europe, where range fragmented and discontinuous, apart from, very locally, northwest Africa (formerly throughout much of west Palearctic from Scotland and Canary Islands to at least Urals and Caucasus, and probably southwest Asia, too, though perhaps not, as has been suggested, Siberia; see Confusion Species); breeds more or less regularly in around 20 countries, but sizeable numbers in only three (Germany, France and Spain) and bulk of rest in just six others (increasing Wales, south Sweden, Poland and Switzerland, decreased Italy and Portugal), including five larger west Mediterranean islands (Mallorca, Menorca, Sicily, Sardinia and Corsica, though probably

declining in all those except the last); up to 13 further countries have only small numbers (currently being reintroduced England and Scotland, recolonised since 1970s Denmark, Belgium, Austria and Czech Republic, and now stable Luxembourg, but greatly decreased and scarce to rare Morocco, Belarus and Ukraine, and possibly only odd pairs Lithuania, Latvia and Romania); isolated Caucasus population shown on most maps may no longer exist (e.g. Abulalze for Georgia); seven more countries or areas within original range have had no proof of breeding since 1970s (Netherlands, Hungary), since 1960s (Bulgaria, former Yugoslavia) or since late 19th/early 20th century (Norway, Albania, Algeria), while three more have had no real evidence in at least recent times of long assumed or suspected breeding (Greece, Turkey, Tunisia); now extinct Canary Islands (see Geographical Variation for Cape Verdes).



5+

**MOVEMENTS** Northern birds typically migratory but, with exceptions, southern sedentary or dispersive. Winter range mainly Iberia, southern France, Switzerland, south Italy, west Mediterranean islands and north Morocco, where local populations all more or less resident and joined by majority from Germany (and probably other parts of central Europe, too), which tend to head roughly southwest into western Mediterranean region. But largely sedentary in Wales, except for some dispersion by juveniles into and through England, rarely also west from there or from Continent into Ireland (some Continental immatures arrive in Britain, and at least one German female known to have joined Welsh breeding stock); and increasing tendency for regular wintering, mainly by adults, in northeast France, south and north-central Germany, even south Sweden (where juveniles and subadults found to comprise only 10% of overwinterers but at least 80% of migrants recorded at Falsterbo); farther north, vagrants have reached southwest Norway (recently more regularly, once December) and Finland. Southwestward movements begin mid August, passing through France in September and reaching Iberia in September–October (10,300 counted over west Pyrenees through autumn 1989). Small onward passage into Morocco via Straits of Gibraltar in August–November, returning end February–early June (100–200 each autumn and spring), and some also cross to Tunisia via Sicily (but rare vagrant Malta). Main return passage through Europe during March (late February through April). Many immatures remain in Iberia in first summer, but others wander north. Very little evidence of movement through eastern Mediterranean and Middle East (former isolated and largely resident population in Caucasus perhaps now extinct, at least in Georgia): no more than scarce in winter and occasional in summer in Turkey, infrequent north Iran, and very rare Israel (two to three regular winterers 1983–89, six other single records); vagrants have, mainly in less recent past, also been recorded in Iraq, Syria, Lebanon, Jordan, northern Saudi Arabia, Cyprus, Egypt and Libya, but some reported sightings from eastern Mediterranean undoubtedly due to misidentification of immature Black Kites [39] in strong sunlight (see 'Confusion Species'). Four observations in India since 1943, from Gujarat southeast to Orissa and north to Kashmir, including 'over 50...assembled for scraps around a shooting camp in lightly wooded semi-desert' (Ali & Ripley), seem highly dubious, as do single reports from East and South Africa.

**HABITAT** Typically nests in open woodland, chiefly broadleaf, in lowlands and foothills; also savannah parkland and scattered groves, and mixed or coniferous woods in some uplands, occasionally even hedgerow trees. For feeding, needs adjacent grassland, upland sheepwalks (Wales), cultivation, low scrub, wetland edge or, more locally, heath or moor; and in winter regular in similar open country. Historically in towns and cities where Black Kite [39] absent (notably Britain to 16th century), and still sometimes on rubbish dumps and by roads in villages and at town edges. Over most of range sea-level to 600 m, locally to 800 m, but nests higher in some mountain areas (Pyrenees, Atlas, at least formerly Caucasus) and recorded to 2,500 m in Morocco.

**FIELD CHARACTERS** Big, slender kite, more or less rufous in tone apart from whitish head, with relatively heavy bill, long wings and longish deep-forked tail (both often shorter, and tail slightly less forked, on juvenile), and shortish weak legs, tarsi half-feathered at front. Usually solitary, sometimes social; perches upright with tail straight down, often within canopy, or stands more horizontally on ground; walks or hops; wing-tips reach base of fork at most, often short of it. Sexes similar, and female averages only 3% larger but nearly 30% heavier; juvenile distinct; more like adult after partial first-winter moult (variable in timing and extent); as adult after complete moult during first summer into second autumn.

**PERCHED Adult** Pale rufous-buff to greyish head, becoming increasingly whitish with age but always finely dark-streaked, contrasts with otherwise generally rufous colour; dark brown upperparts with broad rufous edges (brownier on scapulars and sandier across median coverts) set off by dark flight-feathers, very rufous tail (greyish below) with dark corners and obscure central and lateral barring, and rufous underbody with black streaks strongest on breast. **Juvenile** Broadly similar, but paler, duller, more patterned above and more mottled below; head more buff, whitest on forehead, sides and throat, and turning brownier as tips wear off; upperparts lighter brown than adult's, with mostly very pale rufous-buff edges and tips, but median coverts have broad greyish-white fringes (forming clear panel on each wing) and greater coverts whitish tips (forming thin but conspicuous wing-bar), all less obvious with wear; tail not nearly so rufous above, sometimes brown, with less clearly defined dark corners, but more lateral barring and obscure subterminal band; underbody paler rufous to rufous-buff, streaked and mottled with cream on breast and upper belly. **Immature** More like adult after partial body moult which usually begins October–December (though sometimes April, or not at all), but still juvenile wings (with remains of white-tipped coverts) and tail until complete moult during or after first summer. **Bare parts** Adult eyes pale yellow, juvenile greyish-yellow. Cere yellow; adult bill yellow at base and brown at tip, juvenile black. Legs yellow.

**FLIGHT** Medium-sized raptor with slim build and long but still quite broad wings (five clear fingers) which look set far forward because of long forked tail (deep fork of 7–11 cm when closed, obvious notch even when spread); wingspan 2.4 times total length. Action leisurely and buoyant with deep, slow flexible beats, often wings moved independently and tail constantly twisted and spread, showing great agility through woodland canopy; when increasing speed, almost tern-like with easy flicking beats and body rising and falling; glides with wrists forward and slightly arched, and hands angled back; soars on slightly raised arms with wrists forward and hands almost flat except for tips. **Adult** Rufous tones, contrasting whitish head (no mask), translucent primary-windows, and distinctive tail: uppertail looks almost plain rufous apart from dusky-tipped corners and, against light, this colour shows through strongly on dull greyish underside as pinkish-grey to orange-rufous; upperbody much brownier, particularly so on scapulars, but broad pale feather-edges give rufous cast to back and forewings and form variably distinct lighter and sandier diagonal inner wing-panels along median

coverts; these panels diffuse at front, but more sharply delineated at back by browner greater coverts and dark secondaries; broad blackish tips to outer primaries emphasise squarish windows on inner primaries, greyish above and larger and whiter below, there extending right across bases of outer primaries; rich rufous underbody, blackish-streaked on breast and grading to plain on crissum, looks brighter than the browner wing-linings with thin rufous edges, and also darker than the grey-brown secondaries. **Juvenile** Head and tail duller, underbody paler, but windows more rufous above, back and upperwing-coverts more strongly patterned, whitish line along tips of blacker-looking greater coverts both above and below; head less whitish, especially in worn plumage and particularly from above, and uppertail browner, less rufous, with thin dusky subterminal band and less contrasted corners; pale rufous uppertail-coverts form light patch, while rest of upperparts more variegated by pale rufous-buff edges, which are whiter on median coverts (making diagonal panel on inner wings stronger) and on tips of greater (forming thin but clearer wing-bar); similarly below, blacker-brown greater coverts are emphasised by whitish line along tips (unless plumage very worn), and usually on tips of medians too; although inner primaries rufous above, rest of underwing pattern much like adult's, including white windows, but underbody contrastingly paler rufous than wing-linings and cream-mottled on breast, while crissum hardly darker than the greyish and slightly more barred undertail. **First-summer** Until moult completed before second winter, distinguished by retention of juvenile tail and wing-feathers, including rufous upper-sides to inner primaries and remains of white-tipped coverts.

**CONFUSION SPECIES** Adult almost unmistakable on shape and colour of, especially, tail. Immatures may need more careful distinction from some juveniles of Black Kite [39], particularly (but not exclusively) those of Asiatic race *lineatus*, which breeds almost right across Siberia south into Himalayas and winters to Pakistan and peninsular India (wing and tail lengths, and bold windows, more comparable to Red), and Arabian race *egyptius*, which also wanders down to East Africa (small, but more cream-spotted above and rufous below, with intermediate windows and deeper tail-fork than other Blacks). Rufous young Black Kites more likely to be misidentified as Red than other way around: concentrate on general shape (Black more thickset, with wings and tail proportionately shorter and broader, and noticeably fuller hands with, usually, six fingers); colours and exact shape of tail (Black more barred, less translucent and darker, including distal half below, and usually clearly less forked, but beware *egyptius* and/or broken central feathers); tones of head and body (adult Black darker, with less contrasting head and wing-panels, while paler and often redder juvenile shows more or less distinct dark eye-patches and obvious pale belly and crissum); size and strength of wing-panels and windows (Black generally much less distinct, but beware *lineatus* windows); also wingbeats (Black heavier, less graceful, almost floppy), exact details of wing positions in gliding and soaring and, when perched, position of wing-tips in relation to tail-tip.

**VOICE** Much less noisy than Black Kite [39] and

generally silent away from nest, except when competing for food with other raptors and crows. Commonest call between pair-members is shrill mewling *wee-oo*, with some similarity to Common Buzzard [203], but higher-pitched and usually rapidly repeated as *wee-oo wee-oo wee-oo...*, or with second syllable alone repeated in more tremulous *wee-oo-oo-oo-oo...* When disturbed at nest by human intruder, or in conflict with other birds, repeated whistled *pee-pee-pee...*, often with emphasis on first syllable or sometimes as single scream.

**FOOD** Very varied, depending on ready availability and individual specialisation. Much carrion, also smallish mammals and birds (including eggs and nestlings), reptiles, amphibians, and invertebrates. Carrion varies from corpses of cattle, sheep and other domestic animals to mammals and birds killed or injured on roads or from gunshots, and dead or dying fish, as well as offal from slaughterhouses and food remains from rubbish dumps. Mammals killed range from small rodents to hares and rabbits. Birds, especially young or wounded, include crows, doves, starlings, thrushes, larks, gulls and locally many waterfowl. Other vertebrates usually less significant, but lizards, snakes and amphibians often taken in some regions, as also are earthworms and large terrestrial insects (especially beetles, grasshoppers). Regularly visits good sources of offal or scraps. Forages mainly on wing (to at least 10 km from nest or 20 km from roost); technique varies from high soar to low glide, occasionally with short hover, then either diving on to surprised or injured live prey or circling down to settle near carrion before walking last few metres. Sometimes still-hunts from perch, hawks alate ants in flight, searches for invertebrates on foot, or pirates food scraps from other birds.

**SOCIOSEXUAL BEHAVIOUR** Often solitary or in pairs, especially when foraging or breeding, but sometimes small groups (families?) on migration and larger concentrations (usually tens, up to 100 or more in Mediterranean area and, recently, in winter in north-central Germany) at communal roosts, daytime loafing sites and local rich food sources. Small flocks may soar together in spring or autumn, and single and mutual high-circling frequent early in breeding cycle, but other aerial displays limited. Exaggerated slow-flapping with deep buoyant beats occasional, while talon-grasping and mutual cartwheeling downwards with wings open, not separating until near ground or trees, may occur between pair-members or, probably more often, in attack on intruder.

**BREEDING** Mostly April–July, but early March onwards where resident in south. Platform of dead twigs, typically 45–60 cm across and 25–30 cm deep but often based on old nest of other raptor or corvid (when, with re-use, may become 1 m across), lined with grass, wool and bits of rubbish, but no greenery, at 4–80 m in large fork of broadleaf tree, or close to trunk of conifer (less often out on lateral branch), in extensive wood or small grove; locally in isolated tree clump in more open country, along roadside, occasionally on pylon, and on coasts and islands in south often on cliff. Clutch 1–3 (1–5). Incubation 31–32 days. Fledging, very variously, 48–70 days; independence apparently c4 weeks later.

**POPULATION** Distribution may have extended across 5–8 million km<sup>2</sup> of much of Europe in 17th century, but

now covers no more than 1.2 million km<sup>2</sup> (according to our calculations, though 1.8 million km<sup>2</sup> is given in Hagemeijer & Blair; see below) in around 20 countries. Often quoted national estimates (some no later than early 1980s) indicate breeding population between 10,800 and 12,500 pairs, but 85% or more of that figure made up by just Germany (4,200–47,00 pairs), France (2,600–2,900) and Spain (c5,000); significant errors in any of those three would considerably affect the grand total (1970s/80s estimates for Spain varied from 1,000 pairs to 10,000). Indeed, figures derived from European atlas project (1997) produce much higher total of 21,000+ breeding pairs, again concentrated in Germany (c13,000), Spain (3,000–7,000) and France (c2,500), while German population variously assessed between 9,000 and 25,000 pairs; moreover, one author suggests 19,000–32,000 (even 37,000?) breeding pairs, of which 67% in central Europe (east France to northeast Germany) and 22% in Spain. Six other countries (see Distribution) hold 100–500 pairs apiece: the data for these smaller national populations are generally more precise, though it is not always clear how much totals allow for non-breeders. Although populations generally declining in south of range (Iberia, Italy), notably on Menorca (135 pairs in 1980s, just 12 in 1995), dramatic increases recorded in Sweden (80 pairs in 1982, 480 in 1993) and central Europe (e.g. in parts of Germany by up to 400% since 1970s, and in Switzerland from 90 pairs in 1969 to 300–400 in 1990s). In Britain, kites once ranged throughout, locally at least in urban as well as rural areas, but had been reduced by the early 1900s to a handful in Wales alone; that small nucleus has increased with protection, for a long time slowly but recently rather impressively, and the species is further backed up by reintroductions elsewhere in Britain, with the result that 1997 saw the rearing of 129 young by 151 wild pairs in Wales and of 150 young by 80 pairs of introduced stock in England and Scotland; taking into account non-breeding pairs (26 in Wales) and unmated birds, as well as juveniles, the August 1996 total was over 1,000. Most of the Welsh population is in long-studied and protected area of c3,300 km<sup>2</sup>, giving 1994 figure of c1 pair/21 km<sup>2</sup>, but, though density of 491 pairs in one region of Germany varied from 0 to 69.2 per 10 km<sup>2</sup> in 1988, other Continental figures show averages no higher than 1 pair/90–100 km<sup>2</sup>. On the other hand, in 1990s, densities of 37–47 pairs/100 km<sup>2</sup> found to occur over wide area in Germany's north Harz foothills, with 136 pairs in one 15 km<sup>2</sup> forest. In light of recent winter count of 60,000 in Spain (these of course mostly migrant visitors, a majority of which probably juveniles and subadults), and bearing

in mind increasing tendency for adults to overwinter within northern and central breeding ranges (see 'Movements'), it seems fair to interpret the world numbers as certainly within the upper five-figure range, if not approaching a low six-figure total. Human persecution – directly by shooting and trapping, more indirectly by poisoning against other vertebrates – has been responsible for much of the decline over the past 300 years and is still a problem, especially (but by no means only) in the Mediterranean area. Other adverse factors include new farming practices, 'tidier' countrysides with less mammal carrion and fewer open refuse dumps, and deforestation and other habitat changes, as well as pesticides, electrocution and, more locally, egg-collecting; perhaps also competition with the generally more successful Black Kite [39]. Extinction of Canary Islands population during 1960s probably result of pesticide campaign against locusts. Recent increases in northern and central parts of range appear to be the result of improved protection, the species' successful adaptation to changes in the landscape and, perhaps, better survival rates.

**GEOGRAPHICAL VARIATION** Monotypic. See Cape Verde Kite [38], which often treated as conspecific, but which also has affinities with Black Kite [39]. Red and Cape Verde Kites here considered to be allospecies.

**MEASUREMENTS** ♂ wing 448–532 mm, ♀ 478–535 mm; ♂ tail 301–351 (300–380) mm, ♀ 314–376 (310–390) mm; ♂♀ tarsus 51–55 (51–64) mm. **Weights** ♂ 757 g–1.22 kg, ♀ 960 g–1.60 kg; seasonal data suggest heavier October–March, perhaps especially October, than April–September.

**REFERENCES** Abuladze (1992), Ali & Ripley (1978), Beaman & Madge (1998), Bergier (1987), Berndt (1970), Blanco *et al.* (1987, 1990a/b), Brown *et al.* (1982), Bustamante & Hiraldo (1995), Collar & Andrew (1988), Cortone *et al.* (1994), Cramp & Simmons (1980), Davies & Davis (1973), Davis & Davis (1981), Davis & Newton (1981), Dementiev & Gladkov (1951), Dobler (1990), Evans & Pienkowski (1991), Ferguson-Lees (1957), Filv & Perennou (1990), Fluczynski (1981), Flint *et al.* (1984), Forsman (1999), Galea & Massa (1985), Garrón (1974), Gensbol (1986, 1995), Glutz von Blotzheim *et al.* (1971), Hagemeijer & Blair (1997), Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1983), Heredia *et al.* (1991), Hiraldo *et al.* (1995), Kjellén (1992), McGrady *et al.* (1994), Meyer (1958), Muntaner (1985), Newton *et al.* (1981b), Nisbet (1959), Ogilvie *et al.* (1999), Parker (1975), Schmurre (1956), Shirihai (1996), Shirihai & Christie (1992), Shirihai *et al.* (1996), Stubbe & Gedeon (1989), Sylvén (1977a/b), Thiollay (1967a), Utendörfer (1952), Vaurie (1965), Veiga & Hiraldo (1990), Witherby *et al.* (1939), Woodall (1971), Wortelaers (1940), Wuttky (1963).

## 38 CAPE VERDE KITE

### *Milvus fasciicauda* Hartert, 1914

Plate 7

**DISTRIBUTION** Palearctic (16.5°N); order 1 (now world's rarest raptor); usually treated as race of Red Kite [37], but here considered specifically distinct (see Geographical Variation); formerly much commoner and on at least five islands south to 15.5°N, but now very rare and almost extinct. Endemic to Cape Verde Islands; evident decrease in 20th century (possibly starting earlier)

generally linked to spread throughout this archipelago by Black Kites [39], with resulting competition, supposed interbreeding, and much confusion over identification (the Black Kites, which are not the yellow-billed African race, but of ancient Palearctic stock probably long established on the easternmost islands and then perhaps spreading westward as result of human colonisation

over the past 500 years); Cape Verde Kite apparently now confined to Santo Antão (largest and outermost island in northwestern group), but formerly also on at least São Vicente and São Nicolau in northwest, Santiago in south and Brava in extreme southwest; no valid records for Maio or the other two eastern islands closer to the African coast. Of 32 specimens labelled as this taxon in four major museums (see Hazevoet), 25 are *fasciicauda*, one is apparent *fasciicauda* x *migrans* hybrid, and six are *migrans* (including all four from Maio).



**MOVEMENTS** Reduced population probably entirely sedentary now, but only record from Ilhéus do Rombó (male shot, 1897) is presumed to have been wanderer from nearby Brava, and inter-island movements may not have been so rare in distant past. Indeed, if report of two Cape Verde Kites over sewage works on São Vicente in March 2000 proves acceptable, this may indicate inter-island foraging of c15 km: no others have been seen on that island since 1951 and the habitat is far from typical (see Population).

**HABITAT** Hard to define because of long-standing confusion with colonising Black Kites [39], but now typically around rugged mountain slopes and well-vegetated ravines, where lush valleys, cultivation and some reafforestation; but also forages down to coasts. Sea-level to nearly 2,000 m (Santo Antão), but mostly below 1,500 m.

**FIELD CHARACTERS** Largish kite, mainly brown and rufous, somewhat intermediate in character – including body size, bill depth, length of rather round-tipped wings, and length and fork of tail – between Red and Black Kites [37, 39]: usually considered to be race of Red, but interbreeds to at least some extent with relatively recently colonising Blacks. Solitary now, formerly said sometimes to be social (confusion with Black Kite?); perches and walks like congeners; wing-tips short of base of tail-fork. Sexes similar, though female averages 5% larger; juvenile separable; presumably like adult after first moult. **PERCHED Adult** Reddish crown, nape and upper mantle, and contrasting whitish face, all with fine dusky streaks; rest of upperbody and wing-coverts shades of brown with narrow cinnamon-rufous edges, these most obvious on median coverts; dull reddish tail barred brown on all feathers and wider subterminal band darkest and broadest towards corners; rufous-brown below with clear black streaks. **Juvenile** Fairly similar, but more patterned

above and more mottled below; back, scapulars and shoulders down to median coverts more strongly fringed cinnamon-rufous and more or less tipped greyish; whitish bar along tips of greater coverts; head duller, tail browner and more strongly barred; underbody paler and more buff-mottled. **Bare parts** Eyes dull yellow. Cere yellow, but bill black (cf. Red Kite [37] and African and European races of Black [39]). Legs yellow.

**FLIGHT** Medium-sized raptor with slender build, fairly long round-tipped wings (only five clear fingers?) and quite shallow-forked tail (3–5 cm deep, much less than Red Kite, partial overlap with Black); wingspan 2.6 times total length (cf. Red and Black Kites). No descriptions of wing actions, but likely to be comparable to congeners. (See also colour photo in Hazevoet 1995.) **Adult** Looks predominantly brown above, but dusky-streaked rufous top of head (contrasting with whitish face), more or less dark-banded reddish tail, obvious rufous-buff panel along median coverts, and greyish windows on inner primaries (darker and less conspicuous than on Red Kite); from below, not unlike Red Kite in pattern, including conspicuous whitish windows (though these more marbled grey), but head less contrastingly pale, thinly black-streaked body and wing-linings darker rufous, secondaries darker grey-brown, and greyish tail (pinkish-grey against light) clearly barred (more broadly subterminally). **Juvenile** Back, scapulars and median and lesser wing-coverts more obviously patterned with pale rufous edges and greyer tips; whitish line along tips of primary coverts, greater coverts and secondaries, both above and below, at least in fresh plumage; primary-windows much as adult; otherwise head and tail duller, latter more strongly barred.

**CONFUSION SPECIES** Apart from the two kites (and, rarely, vagrant harriers *Circus* and falcons *Falco*), only raptors of Cape Verde Islands are Osprey [8], Egyptian Vulture [54], and endemic races of Common Buzzard [203], Common Kestrel [277] and Peregrine Falcon [309], which present no problems. But confusion between Cape Verde and Black Kites [39] so long-standing that, although latter occurred on the same islands from at least mid 19th century and significantly increased in 20th, their co-existence was not really appreciated until 1960s (in 1955, for example, 'The local form [of the Red Kite] looks like the Black Kite') and confusion persisted to 1980s: the Black Kites there are the normally migratory European race, not the more rufous, darker-headed and yellow-billed resident form of adjacent West Africa (so distinguished from Cape Verde Kite by far less rufous tones – especially on hindneck, shoulders, uppertail and wing-linings, and darker rufous underbody less clearly black-streaked – by lack of bold whitish windows on undersides of proportionately shorter wings, and by often pronounced face-mask, especially on juveniles, while tail usually less forked and more broadly barred). But possibility of hybrids needs also to be borne in mind.

**VOICE** 'Very silent' (de Naurois); any differences in calls apparently not described.

**FOOD** Reported scavenging on urban refuse and along shorelines, but this may be result of long-standing confusion with Black Kite [39] in Cape Verde Islands, where allegedly 'no significant difference' in ecology,

Observations in 1990s identified goat carcasses and large grasshoppers as favoured food. Probably opportunist predator like congeners.

**SOCIOSEXUAL BEHAVIOUR** Now usually seen singly. (Said formerly to concentrate at rubbish tips, sources of fish-offal, and tideline flotsam, but much past confusion with Black Kite [39].) No descriptions of aerial displays.

**BREEDING** Few data, and no nest actually recorded since one on São Nicolau in 1968. Apart from one October record (B&A), January–June (mostly March onwards). Stick nest on cliff or rock ledge. Clutch 2–3. No information on incubation or fledging.

**POPULATION** In 1950s reported as 'common everywhere, especially about the slums in the towns and along the shore', but the co-existence of Black Kites [39] was not understood at that time. It can be argued that there is only one certain record (male and female specimens, October 1924) for São Vicente, where the habitat is mostly flat, dry and barren, leaving evidence of established presence of Cape Verde Kites on the only four mountainous (and mostly larger) islands with areas of lush vegetation. These total under 2,200 km<sup>2</sup> (one-third less than the area of central Wales that held 177 pairs of Red Kites in 1997; p.379) and it seems unlikely that the population was ever higher than three figures. In the late 1980s it was put at only 50–100 birds (including hybrids), and in the mid 1990s at 'some tens of pairs', confined to the two largest islands, with the bulk apparently centred in the wild and rugged southwest hinterland of Santo Antão, in mountains and ravines behind the coastal townships of Monte Trigo and Tarrafal; it was considered rare in interior Santiago (where its status and the involvement of hybrids far from clear), and extinct everywhere else. But even those recent estimates probably far too high: in 1996 and 1997, the first complete censuses of kites ever conducted in the archipelago located only four to six Cape Verde Kites, all on Santo Antão and one of them in the southwest, while a further thorough search in 1999 produced just two, one in the north and one in the south of that island (in same surveys, three to five Black Kites found in 1996–97 and only one in 1999). Conservation of this threatened endemic should be a priority on Santo Antão, but almost certainly already too late to save it from extinction.

Though a few Black Kites had been collected on the islands long before the specimens of Cape Verde Kite from which this endemic taxon was first described in 1914, it was until the 1960s generally assumed that all

kites there were the same species. Then the endemic was 'found only (and alone) in the extreme northwest [Santo Antão and São Nicolau]... having been driven back recently by the expanding [Black Kites]' (de Naurois). These Black Kites, being of ancient Palearctic stock, were probably long established on the easternmost islands and only relatively recently spread westward, but they too are now all but extinct and the other Cape Verde scavenging raptors are also now declining throughout these islands: one very likely cause is the widespread practice of trying to reduce the numbers of feral dogs and cats by putting out poisoned meat in towns and villages and then dumping the carcasses ('up to 50 at a time') in the open countryside. This and the widespread use of rodenticides, changes made in the landscape and in the keeping of livestock by an increasing human population, and consequent shortage of food, combined with human persecution, appear to have driven both kites to the brink of extinction in the Cape Verdes.

**GEOGRAPHICAL VARIATION** Monotypic. Generally treated as race of Red Kite [37], but significantly different from that otherwise monotypic species in size, proportions and various aspects of plumage and behaviour, and clearly far longer isolated than the (now extinct) Canary Islands population. Also thought to have interbred with later-colonising Black Kites [39], resulting in at least F<sub>1</sub> hybrids, but this now being questioned (Hille & Thiollay). Because this species is intermediate in character between the other two *Milvus* kites, because the differences between those are greatest where they are sympatric in the western Palearctic, and because Black Kites elsewhere show certain characters which in Europe are features more of Red Kite (e.g. bold whitish windows, redder underparts, yellow on bill), the Cape Verde Kite may represent a relict population closer to a common ancestral stock (see de Naurois, Hazevoet). Cape Verde Kite treated here as forming a superspecies with Red Kite.

**MEASUREMENTS** ♂ wing 420–475 mm, ♀ 434–482 mm; ♂ tail 280–357 mm, ♀ 268–350 mm; ♂ tarsus 49–60 mm, ♀ 53–60 mm (measurements of 25 specimens: C) Hazevoet). **Weights** No data.

**REFERENCES** Alexander (1898), Bannerman & Bannerman (1968), Barone & Delgado (1999), Bourne (1955, 1986), Chrabry *et al.* (1989), Collar (1996), Cramp & Simmons (1980), de Naurois (1969, 1972, 1984, 1987), Hartert (1914), Hartog (1990), Hazevoet (1995, 1996, 1997, 1999a/b), Hazevoet *et al.* (1996), Hille (1998), Hille & Thiollay (in press), Madge (1985), Ortlieb (1988, 1997), Sangster (2000), Summers-Smith (1984), Vaurie (1965).

## 39 BLACK KITE

*Milvus migrans* (Boddaert, 1783)

Plate 7

Other names: Black-eared/Eared/Large Indian Kite (Asiatic *lineatus*), Pariah/Small Indian Kite (Indomalayan *grevilla*), Fork-tailed Kite (Indonesian and Australasian *affinis*), Yellow-billed Kite (African *egyptus* and *parasitus*), Common Kite.

**DISTRIBUTION** Afro-Malagasy, Palearctic, Indomala-

yan and Australasian (67°N to 38°S), but absent from New World; order 7+; despite declines (especially of highly migratory nominate race in northwest Africa, much of Europe and western Asia), still abundant in Africa and southern Asia, and probably commonest raptor in world terms. Breeds throughout much of sub-Saharan Africa east into the Comoro Islands, Madagascar and



southwest Arabia, west into the Cape Verdes (where now all but extinct) and north up Red Sea and Nile valley into Egypt; in northwest Africa (north Morocco, northernmost Algeria, northwest Tunisia) and most countries of continental Europe (north to 61–66°N in European Russia, but very rare and local, irregular, or old records only, along northwestern fringe from Belgium through Netherlands and Denmark into Fennoscandia, and absent except as migrant from Mediterranean islands) and across much of mainland Asia (north to 59–67°N in Russia as far as Okhotsk, but missing from deserts of western China and surrounding highest mountains, and very local in much of Middle East and Arabia through to Iran); also in southern Kurile Islands, Japan, Taiwan, Hainan, Andaman Islands and Sri Lanka; and, after gap (absent Greater Sundaes and Philippines), locally in Sulawesi, Lesser Sundaes (Lombok to Timor), easternmost New Guinea, New Britain, and northern and central Australia.

**MOVEMENTS** Most Eurasian populations migratory, or largely so, except those of southern and eastern Asia south of line from east Pakistan and Himalayas northeast through China and Korea to southern Ussuriland and Japan, which sedentary or, at most, make pre-monsoon movements or disperse locally according to availability of food. Birds of the nominate European race, including those of westernmost Siberia (see Geographical Variation), leave mainly in August (July–September) and winter almost anywhere – except dense forest – in sub-

Saharan Africa south to Cape Province, where they appear in October, and, departing north again in February, mostly arrive back in April (end February–May); a few remain in Mediterranean region and rather more (probably from westernmost Asia) in Middle East down to southern Arabia. In general, other Asiatic birds do not leave until late August–early September (August–early October) and winter mainly in southern Asia from east Pakistan eastwards, but some as far west as southern Iraq and Iran. In Australia, population varies from sedentary or partially migratory to eruptive in response to drought, heavy rains or food shortage, then occurring in many non-breeding areas; it may be that many or all Black Kite records from Lesser Sundaes relate to migrants moving north from Australia. Indian birds similarly move in relation to monsoon seasons, but migrations of native African populations more complex: in broad terms, while some present in many areas throughout year and breeding does occur in West Africa in March–June, most breeding is in September–March, more northerly birds move down to about equator southwards around August–October and return north again by March, and southernmost breeders correspondingly move north to equatorial East Africa after breeding. Spectacular migration movements can be seen at either end of Mediterranean and across Sicilian Channel, west and east of Black Sea, and through Himalayan passes and gorges; often these take form of seemingly endless streams of singles and small groups, rather than big flocks. In Gibraltar region, 40,000–60,000 pass through

each autumn (over 15,000 have been recorded on one day) and, according to wind direction, others may be up to 100 km or more west or east of narrowest crossing; at Cap Bon, Tunisia, two- and three-week March–May counts have totalled 2,400 and 4,200; in Israel, highest spring total at Eilat has been 36,680 (including 20,450 on one day), while highest autumn total at Kafr Qasim only 1,195 (cf. Western Honey-buzzard [18]); at Arhavi and Borçka in northeast Turkey, 50-day autumn total of 5,575 included 1,217 on 30th August; in Bhutan, several hundreds passed down one gorge in half an hour and the stream was continuing (Ludlow 1937). Most immatures of Eurasian populations travel no farther north than the south of the breeding range in their first summer. Vagrants have occurred north to Scotland, Denmark and Norway and, in eastern Asia, east to Kamchatka and Nansei-shoto, and southeast to Palawan (Philippines), Borneo and Sumatra.

**HABITAT** Very varied, if most typical of lowland and foothill areas, especially wetlands, river edges, estuaries and coasts, and villages, towns and, regionally, big cities, as well as cultivation, savannah and woodland; not in dense forest or, except on migration, pure desert, but sometimes in open forest or clearings, and in semi-desert or around nomad encampments. Sea-level to 4,900+ m over range as whole, but mostly below 1,000 m in Europe, foraging to 2,000 m or, in Caucasus, even 3,000+ m; in Africa breeds at up to 3,000 m and in Himalayas 4,900 m, occurring even to 5,300+ m.

**FIELD CHARACTERS** Largish and relatively stocky kite, mainly dingy brown to blackish but for often paler head and some rufous below, with fairly heavy bill, longish wings and shallow-forked tail (fork often less obvious on juvenile), and rather short weak legs, tarsi half-feathered at front. Often gregarious; perches upright on trees, posts or buildings, or stands horizontally on ground; walks, hops or runs; wing-tips near to tail-tip in northern migratory populations, but hardly reach base of fork in southern tropics. Sexes similar, and female averages only 2–6% larger (different races) and 10–17% heavier; juvenile distinguishable; as adult after completion of moult towards end of first year.

**PERCHED Adult** In different populations, ground colour of dark-streaked head varies from greyish-white, with or without rufous tinge, to brown, or crown darker and forehead and face paler with variably obvious dark eye-patches through to ear-coverts (see Geographical Variation); otherwise all dark brown above, with lighter feather-edges, except for dark-streaked paler wing-panels, fairly to very conspicuous in different races, formed by median and, to different extents, lesser wing-coverts; primaries contrastingly blacker; tail inconspicuously barred; underbody more or less tinged rufous with fine dark shaft-streaks. **Juvenile** Somewhat paler and more contrasted, particularly in fresh plumage, though individually and, again, racially variable: ground colour almost as dark brown as adult, but crown, hind-neck, breast and flanks made paler by white to creamy spots and shaft-streaks, while blackish primary and greater coverts and flight-feathers, and more heavily barred tail, all have thin whitish tips; sometimes white streaks on top of head predominate so that, with pale cheeks, whole head looks whitish but for dark eye-patches, which generally stronger than on adult; wing-

panel usually more extensive and more obvious, particularly in fresh plumage, when most lesser and all median coverts have buff or pale rufous tips that gradually whiten and later abrade; even in worn plumage, underbody paler than adult, without rufous, and belly and crissum palest of all. **Bare parts** Adult eyes grey-brown, light brown or pale yellow, juvenile brown to grey-brown. Cere yellow; bill usually black over most of range, but lower mandible may be more or less yellow and adults of African races have whole bill yellow (see Geographical Variation). Adult legs yellow to orange-yellow, juvenile yellow.

**FLIGHT** Dark medium-sized raptor, compact yet quite slender, with small head, longish narrow-looking wings (usually six clear fingers, but juvenile may show only five) and shallow-forked tail (notched when closed, almost straight-ended when spread); wingspan 2.4 times total length. Buoyant floppy flight with slow beats, wings often rowed and flexed independently, tail twisted and spread, body moving up and down; glides and soars on flattish or somewhat bowed wings, often wrists forward, combining with down-pointed head to give distinctively hunched look; occasionally hovers briefly and clumsily. **Adult** Dingy brown to dark brown above, rather uniformly so apart from variably contrasting and often diffuse inner wing-panels of lighter brown, and obscure pale windows behind blackish fingers; in different races, streaky head may or may not look greyish, or show paler face or dusky mask or, in Africa, have yellow bill (see previous paragraph and Geographical Variation); apart from this head variation, also rather uniformly dusky below, with more or less rusty tinge to underbody, but tail paler with indistinct dark barring, and primary-windows varying from almost invisible, except from directly underneath, to nearly as conspicuous as on Red Kite [37]. **Juvenile** Generally less uniform than adult, at least until pale feather-tips wear off: top of head variably streaked whitish, dark mask usually conspicuous, diagonal upperwing-panels larger and more obvious, pale lines along tips of greater and primary coverts, as well as along tips of flight-feathers and tail; below, brown breast and flanks streaked and spotted with cream, contrasting with pale throat, belly and crissum (though note belly and crissum can also be lighter on adult of eastern Asiatic race *lineatus*); undertail two-toned, paler and more obviously barred at base, in contrast to broad dark subterminal band and thin whitish tip; underwings generally look darker than body, although linings tipped pale rufous-buff, white lines along greater and primary coverts, and often larger and more obviously dark-banded whitish windows.

**CONFUSION SPECIES** Generally not difficult to identify, but in West Palearctic some juveniles in strong light can look rufous enough to be mistaken for young Red Kite [37] (which also see): this applies especially in Middle East, where wandering immatures of longer-tailed and bolder-windowed Asiatic race *lineatus* and deeper tail-forked and more rufous-bodied Arabian race *argyptus* may occur (but Red slimmer, more elegant, with longer, narrower, five-fingered wings and longer, more clearly forked tail which, even as juvenile, looks reddish above and paler and more uniform below apart from dark distal corners). In Eurasia and Africa, otherwise, dark-morph Booted Eagle [230] (more compact

build, heavier head and bill and feathered tarsi when perched, but in flight can look very similar at distance, not least because of upperwing pattern, but tail squared when folded, rounded when spread, uniform in colour above and below, and paler than rest of underside, also white 'lamps' beside heavier head, whitish U on uppertail-coverts, pale wedge on inner primaries below) and all-dark immature Northern Marsh Harrier [100] (more pointed wings always distinctively raised in shallow V when gliding or soaring, slightly rounded tail) need to be distinguished; in Africa alone, especially also darker morphs of Wahlberg's Eagle [229] (small-eagle shape, baggy thighs and feathered tarsi when perched, 'crossed planks' in flight with narrow parallel-edged wings at right-angles to well projecting head and long narrow tail usually folded with squared or slightly rounded tip) and, only when perched, just possibly juvenile Grasshopper Buzzard-hawk [159] (white throat, dusky moustaches, almost invariably some rufous showing in wings, which reach tail-tip). In east and southeast Asia, similarly, the other three *Butastur* buzzards [160–162] can look slightly kite-like at rest, while from India and south China to Australia juvenile Brahminy Kite [41] (tips reach end of shorter rounded tail, broader wings with no pale panels above) must also be borne in mind. In Australia and New Guinea, however, main confusion species are Whistling Kite [40] (paler, or more spotted above, with grey cere and creamy feet, broader and more rounded wings with different underpattern, and rather plain pale tail well rounded) and dark-morph Little Eagle [231] (stockier, with heavier bill and head, feathered legs and big feet, shorter primaries and shorter squared tail); although sometimes Black misidentified as Square-tailed Kite [35], latter very different (including strikingly long wings – especially hands – exceeding tail-tip when perched, and raised harrier-like in gliding flight, showing barred fingers and plain white windows below). Except for Brahminy and Whistling Kites, all confusion species normally solitary.

**VOICE** Often noisy, not only in pre-breeding and nesting seasons, but also in prolonged active post-breeding period in situations varying from contact between pair-members (sometimes duetting) to, at any time, intra- or interspecific conflicts at food, daytime loafing sites or roosts. Basic call is long-drawn mewling squeal, *klaw-rrrrrrrr*, downslurred with essentially peevish gull-like quality, but, according to mood and circumstances, varying in volume, emphasis, pitch and tone; *per-per-per...* notes may be substituted for second part or, in aggression, harder *kik* or *ki* in similar series. Quality may vary from squeal or whistle to quavering trill or whinny.

**FOOD** Varies seasonally, regionally and individually. Readily attends carrion of all sizes, often preceding vultures at larger carcasses, and dense urban concentrations of kites depend largely on mammal- and fish-offal, human food scraps and other garbage. But also takes wide variety of live prey – many small rodents and other mammals (to size of young rabbits and hares), terrestrial and wetland birds and their young, lizards and snakes, amphibians, fish, insects, earthworms, molluscs and crustaceans – and in West Africa frequently eats percarps of oil palms *Elaeis*. Versatile, agile and dextrous; forages mainly in flight, low or fairly low, at 10–90 m,

suddenly swivelling around and swooping down to snatch up almost anything edible from ground, water, tree or busy street: piece of offal, dead or live mouse or small bird or frog or fish, or, more particularly in India and Africa, items from market stalls, food in pots or baskets carried on people's heads, even sandwiches from picnickers' hands. Follows fishing boats and larger ships in river mouths or close inshore for offal or scraps; also snatches live fish in shallow water. Attracted to bird colonies: forages among seabirds for scraps of fish, or eggs or young, or snatches whole nests of weavers. Occasionally chases and even catches smaller birds in flight, or harasses other raptors to force them to drop prey, and recorded snatching fish or disgorged material from herons, ibises, storks, even Giant Kingfisher *Megaceryle maxima*. Insects, especially termites and orthopterans, also dragonflies and beetles, are caught and eaten on the wing, or may be picked up on foot, especially by termite mounds or in vicinity of grass fires.

**SOCIOSEXUAL BEHAVIOUR** Usually gregarious, especially when feeding or roosting (sometimes thousands together); may breed solitarily, especially in Europe, but often in loose groups, and in tropics sometimes densely concentrated in urban areas, with nests separated by only few metres; also tends to migrate in scattered flocks or long streams, though sometimes singly. High-circling frequent by flocks, pairs or single birds, but other aerial displays limited to slow-flapping by pair, male diving at female, and occasional talon-grasping sometimes developing into mutual cart-wheeling down almost to ground or trees.

**BREEDING** With breeding range spanning 105° from north to south, wide range of dates: temperate Eurasia mainly March/April–July/August, but February onwards at latitudes of Egypt, Assam and south China; tropical Africa December–June in north, August/October–February/March in south, and almost year round near equator; in peninsular India September–April, but December onwards in Sri Lanka; Australia December–August in north, July–February in south. Compact but untidy platform of mainly dead sticks and twigs, often based on old nest, typically 45–70 (80–90) cm across and 30–45 cm deep, lined and decorated with rags, paper, plastic, wire, dung, wool, bones and other rubbish, rarely greenery, at 5–30 m on branch, fork or crown of any tree, singly or at woodland edge, sometimes on ledge or emergent bush on cliff, occasionally on pylon or, locally, building. Clutch 2–3 (1–5). Incubation 25–38 days. Fledging 42–56 (66) days; independence 15–50 days later.

**POPULATION** Probably still world's commonest raptor, though suffering, particularly in Europe, parts of Asia and the Mediterranean region, from carcass poisoning, agricultural pesticides and water pollution, as well as centuries of shooting. Breeding distribution extends over 65–70 million km<sup>2</sup> in more than 100 countries on four continents. National estimates between late 1970s and early 1990s seem to suggest European breeding population of 80,000–90,000 pairs, of which three-quarters in European Russia, perhaps 9,000 in Spain (put at 25,000 in 1970s) and 5,800–8,000 in France, with Germany, Switzerland and Italy the only others believed to have more than 1,000 pairs apiece. These numbers are not

particularly large, but suggest that some 250,000 birds may move south from Europe into Africa in autumn and perhaps 200,000 return in spring (though these are higher figures than indicated by maximum counts at migratory funnels; see Movements and cf. Western Honey-buzzard [18]). If we assume that the population of Palearctic Asia is at least as large as that of Europe – the species is common across to Japan – we may have a zooregional pre-breeding total of at least 400,000. In areas of Europe where species reasonably common, recorded densities have varied from 1.4 pairs/km<sup>2</sup> in Switzerland (with local concentrations up to 17 pairs/km<sup>2</sup>) and 2 pairs/km<sup>2</sup> in Germany to 8.6 pairs/km<sup>2</sup> in Russia. The species is also widespread and reasonably common in Australia (e.g. 47 pairs occupied 20 km of floodplain, flocks of up to 2,800 recorded), but it is in sub-Saharan Africa and the Indian subcontinent that it is really common. Few data on densities or numbers are available, and it has to be remembered that these more southerly populations are usually breeding, often in concentrations, at much the same time as the Palearctic migrants are present, which means that impressions of abundance are increased. Yet in Delhi, India, in 1968–69 it was calculated that around 2,400 pairs were nesting in 150 km<sup>2</sup>; the average was thus about 16 pairs/km<sup>2</sup>, but in the old city the density was 50–80 pairs/km<sup>2</sup> and in the new development (now New Delhi) less than 2 pairs/km<sup>2</sup>. Thus, as cities are modernised, the habitat becomes much less suitable: in Istanbul, Turkey, 500 pairs in 1930s were reduced to 10 pairs in 1970s. Urban areas are by no means the only breeding sites, but it is adaptability to artificial environments that has made this kite so successful and, as towns lose their old character and farming methods change, so it is likely to decrease. Now almost extinct on Cape Verdes (see discussion under Cape Verde Kite [38]).

**GEOGRAPHICAL VARIATION** At least 12 races named, including '*reichnowi*' and '*arabicus*' referred to below under *M. m. migrans* and *M. m. aegyptius*, but usually not more than eight recognised and here only six.

*M. m. migrans* (almost entirely migratory in north-west Africa, Europe and west Asia east roughly to Pechora, Kazakhstan, Kirgizstan, Afghanistan and Baluchistan, wintering mainly in subtropical Africa but also Mediterranean area through Middle East to Pakistan and perhaps northwest India; sedentary relict population on Cape Verdes now nearing extinction) As above; tail-fork 20–35 mm.

*M. m. lineatus* (chiefly migratory in central and east Asia south to Himalayas and northern Indochina, wintering in south Asia, but sedentary in Japan, far east Russia, Korea and China southwards) Largest race; browner on crown and underbody, contrasting creamy-buff belly and crissum, large white patches on underwings.

*M. m. govinda* (mainly sedentary in Indian subcontinent, including much of Pakistan, Sri Lanka and east through Burma and Thailand to southern Indochina, wandering south to peninsular Malaysia) Averages smaller than *migrans* or *lineatus*; intermediate in plumage, including wing-patches, but crown more rufous.

*M. m. affinis* (largely sedentary in Sulawesi, Lesser

Sundas, east New Guinea, New Britain, and north and central Australia, wandering farther south in Australia) Smallest race, hardly overlapping, sex for sex, with any other; rather uniformly dark brown apart from pale face, clear diagonal on upperwings.

*M. m. aegyptius* (largely sedentary in Sinai, Nile valley and both coasts of Red Sea, wintering south to Sudan and, perhaps chiefly on coast, Kenya) Averages smaller than European birds, but same size as northwest African population of nominate *migrans* (formerly separated as '*reichnowi*'), and tail-fork 30–45 mm; more uniformly brown head and neck, more rufous underbody, more distinctly barred tail; adult bill usually all yellow (juvenile black), but in still smaller birds of southern Arabia and north Somalia, at least migrating south to coastal Kenya ('*arabicus*'), 'varies individually from yellow to blackish' (Vaurie).

*M. m. parasitus* (sub-Saharan Africa, also Comoros and Madagascar, with strong seasonal intracontinental movements north and south) Smaller than typical *aegyptius*, with tail-fork 30–46 mm; more cinnamon-rufous below; adult bill always yellow.

These last two small, yellow-billed, deeper-forked and less-streaky forms are sometimes treated as a species distinct from the black-billed populations of Eurasia (but see comments on '*reichnowi*' and '*arabicus*'). The large eastern Asiatic *lineatus* has also been considered a separate species, but it has wide zone of intergradation with nominate *migrans* in western Asia, and much narrower one with *govinda* in Himalayas, so there is even less justification for that. Apart from the above, two island populations are often distinguished: (a) '*formosanus*' (sedentary in Taiwan), which is very like *lineatus* but averages smaller; and (b) '*tenebrosus*' (Cape Verdes), whose situation is complicated by interbreeding with the resident kite (see Cape Verde Kite [38]).

**MEASUREMENTS** *M. m. migrans* ♂ wing 417–475 mm, ♀ 430–482 mm; ♂ tail 250–281 mm, ♀ 254–282 mm; ♂♀ tarsus 50–62 mm. *M. m. lineatus* ♂ wing 433–505 mm, ♀ 460–529 mm; ♂♀ tail 288–345 mm, tarsus 58–67 mm. *M. m. govinda* ♂ wing 410–453 mm, ♀ 418–465 mm; ♂ tail 246–289 mm, ♀ 244–280 mm; ♂♀ tarsus 49–58 mm. *M. m. affinis* ♂ wing 383–402 mm, ♀ 414–420 mm. *M. m. aegyptius* ♂ wing 403–443 mm, ♀ 400–465 mm; ♂ tail 229–271 mm, ♀ 268–286 mm. *M. m. parasitus* ♂ wing 408–425 mm, ♀ 425–450 mm; ♂♀ tail 240–272 mm, tarsus 41–49 mm. **Weights** *M. m. migrans* ♂ 630–928 g, ♀ 750 g–1.08 kg, unsexed from 542 g. *M. m. lineatus* ♂♀ 750 g–1.08 g. *M. m. affinis* ♂ 500–640 g, ♀ 560–671 g, unsexed 360–775 g. *M. m. parasitus* ♂ 567–620 g, ♀ 617–734 g.

**REFERENCES** Abuladze (1992), Ali & Ripley (1978), Allan (1978), Baker-Gabb (1984b), Beaman & Madge (1998), Bell (1985), Bergier (1987), Brazil (1991), Brooke (1974), Brown *et al.* (1982), Bustamente & Hiraldo (1989, 1990, 1995), Campbell J (1985), Coates (1985), Cramp & Simmons (1980), Cupper & Cupper (1981), Delibes (1975), Dementiev & Gladkov (1951), Desai & Malhotra (1977, 1979), Etchécopar & Hùc (1978), Fluczynski (1981), Fluczynski & Wendland (1968), Flint *et al.* (1984), Forsman (1999), Galushin (1971), Génsbol (1986, 1995), Ginn *et al.* (1989), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Gore (1990), Grimmett *et al.* (1998), Hagemeyer & Blair (1997), Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1983), Haneda &

Kozumi (1965), Hille & Thiollay (in press), Hiraldo *et al.* (1990), Hobbs (1987), Hollands (1984), Kemp & Kemp (1998), Klapste (1983), Krystantus (1993), Koga & Shiraishi (1987), Koga *et al.* (1989a, b, c), Kuhlman (1981, 1987), Langrand (1990), Lavers & Johnson (1995), Macdonald (1980b), Maclean (1993), Makatsch (1953), Marchant & Higgins (1993), Meyburg (1966, 1967), Meyburg & van Balen (1994), Olsen *et al.* (1993), Olsen & Marples (1993), Pakentian (1979), Porter *et al.* (1981, 1986), Roberts (1982), Roberts

(1991), Rogacheva (1992), Sathiresan (1989a, b, c, 1990a, b), Schifferli (1967), Schodde & Tiedemann (1988), Shirihai (1996), Shirihai & Christie (1992), Shirihai & Yekutieli (1991), Shirihai *et al.* (1996), Smythies (1986), Souter (1981, 1987), Sylvén (1977a, b), Thiollay (1976b, 1978c, 1989c), Utendörfer (1952), van Balen (1994), Vaurie (1965), Veiga & Hiraldo (1990), Viñuela (1993), Viñuela & Suwer (1992), Wells (1999), White & Bruce (1986), Witherby *et al.* (1989), Zimmerman *et al.* (1986)

## 40 WHISTLING KITE *Haliastur sphenurus* (Vieillot, 1818)

Plate 15

Other names: Whistling Hawk, Whistling Eagle

**DISTRIBUTION** Australasian (1°S to 43°S); order 6; variously uncommon to abundant. New Guinea (except western Irian Jaya, mountains and dense forest), New Caledonia, Australia (except inland deserts) and, more recently, eastern Tasmania.



**MOVEMENTS** Sedentary, partially migratory, or nomadic; more migratory in southeast Australia, resulting in autumn and winter influxes in coastal areas of north and east, also corresponding decreases inland. Longest recorded ringing recovery 2,430 km (near Darwin to northern New South Wales).

**HABITAT** Almost anywhere from open forest to savannah and plains, but usually in vicinity of trees near water; thus, in Australia commonest in eucalyptus woodland near lakes, swamps, rivers, estuaries and coasts; in New Guinea frequents similar wet habitats, and also grasslands, paddocks, airstrips and forests if water nearby; largely absent from closed-canopy forest and urban areas, though not uncommon in such places in southwest Australia. Sea-level to 1,400 m, but commonest below 800 m.

**FIELD CHARACTERS** Large, scruffy-looking kite, sandy and brown as adult but juvenile spotted above, with small head, slight crest, fairly long wings and tail, short legs. Perches rather upright, often openly on dead branches of wetland trees or, in coastal habitats, on buoys, posts

and boat masts; walks easily with fairly horizontal posture; wing-tips fall short of tail-tip. Sexes similar and overlap in size, though female may be as much as 21% larger and 42% heavier (mid-ranges 8% and 24%); juvenile separable, but apparently starts moulting direct to adult plumage during second half of first year (timing unclear and at least some juvenile wing-feathers may be retained into second year).

**PERCHED Adult** Mainly sandy-brown with slightly darker back, much darker brown secondaries, blacker primaries and plain greyish tail; pale-streaked brown head, more blotchy cream and pale brown underbody, slightly darker shoulders and rufous-tinged scapulars also all have fine dark shaft-streaks; no yellow in bare parts.

**Juvenile** Broadly similar, but darker and more rusty-brown above, with less contrasting flight-feathers, all clearly spotted buff or white; head (except for paler lores and cheeks) and underbody more obviously streaked pale brown and cream-buff. Becomes paler with wear and sunlight. **Bare parts** Adult eyes dark brown, juvenile blacker-brown. Adult cere pale grey, juvenile dark grey with pale grey edges. Legs cream to yellowish- or bluish-white at all ages.

**FLIGHT** Medium-sized soaring raptor, slightly smaller than biggest Australian kites [35, 36], but still averaging larger than Little Eagle [251], with small head, relatively slim body (may look fatter because of pattern of axillaries and thighs), longish wings with long fingers often separated, and longish round-tipped tail. Slow flight, with rather deep and jerky towing action and some up-and-down body movement; soars, wheels, dips and manoeuvres with ease and grace, usually at no great height above ground; forages mainly by gliding and circling with distal halves of wings bowed down and carpals thrust slightly forward, resulting in curved trailing edges; hovers rarely and rather clumsily. **Adult** From above, shows pale brown head and wing-coverts with slightly darker back, greyer tail, contrasting dark brown secondaries and black primaries; comparable pattern from below made more distinctive by still paler undersides of body, tail and wing-linings against dark secondaries and outer primaries now separated by light wedge on inners; at closer ranges, thighs, axillaries and mid-wing diagonals stand out as paler still, but faint barring on secondaries and tail always hardly visible. **Juvenile** Pattern generally similar below, though flight-feathers less contrasted and body more streaked; above,

more uniformly dark brown, with pale spots visible at shorter distances.

**CONFUSION SPECIES** Often confused in flight with pale-morph Little Eagle [231], particularly of Australian race, owing to some similarities in patterns of both upper- and underwings, but latter has narrower pale diagonals above and more contrasted light and dark areas below, with straighter wings held flat, and shorter and less extensively black primaries; also larger head, stockier body, shorter and more squared tail, and feathered legs. Small Australasian race of Black Kite [39] is slimmer, with thinner and more pointed wings, forked or triangular tail, narrower upperwing-panels, and otherwise darker and more uniform plumage. Confusion less likely with juveniles of Squate-tailed Kite [35] (much more rufous, with thin upswep wings relatively broad towards tips, long barred fingers, dark carpal arcs, squared tail) and congeneric Brahminy Kite [41] (bulkier and more compact, with shorter primaries and tail, all-dark upperwings, different pattern below including duskiest body and linings and all primaries black-tipped and pale-based, glides on flat wings).

**VOICE** Often noisy, even more so at nest (especially if mobbed by other birds, such as corvids). Main call, both perched and in flight, is clear leisurely descending whistle, *oooo*, preceded or, more usually, followed by fast rising chatter of 4–7 shrill staccato notes.

**FOOD** Variety of small mammals, birds, reptiles, fish, frogs, insects, crustaceans and carrion; one study in New South Wales showed 64% mammals, 29% birds, 6% reptiles, and 1% crustaceans. Rabbits often significant food; birds mainly small, sick, injured or unledged, occasionally young poultry. Principally eats carrion in winter. In New Guinea predominantly a scavenger, commonly of dead fish and other carrion floating in water, but also catches live food, including aerial insects. Most prey taken on ground or from water. Usually either still-hunts or forages rather haphazardly in flight, occasionally hovering clumsily; patrols roads and edges of grass fires. Hawks flying insects. Sometimes piratical, robbing other raptors in flight and forcing large waterbirds to regurgitate food. Obtains carrion from abattoirs, farms, roadkills and seashores; may wade to reach dead fish, but usually circles widely and spirals down to grasp it without wetting plumage.

**SOCIOSEXUAL BEHAVIOUR** Often solitary or in pairs, but regularly also parties or flocks of up to several tens during nomadic wanderings or at roosts and abundant food sources. Presents talons to others during food arguments. In breeding season, single pairs or several together high-circle with much calling; earlier on, newly arrived flocks sometimes soar noisily in larger concentrations. Aerial manoeuvres not generally spectacular, though occasionally pairs come together in mild flight-play, perhaps tumble briefly downwards for a few metres, and then separate; talon-grappling recorded twice, followed by lateral spin and whirling.

**BREEDING** Likely any month in response to plentiful food, but probably most commonly July–December in Australia. Untidy nest of sticks, quite small at first but up to 150 cm across and 100 cm deep after repeated use, lined with green leaves and available rubbish; 3–62 m up in tall tree, often eucalyptus in Australia, but occasionally on bridge pylon. Clutch 2–3 (1–4). Incubation 35–40 days. Fledging 44–54 days, with dependence for 6–8 weeks.

**POPULATION** Recorded densities of, for instance, 1 pair/19 km<sup>2</sup> and 1 nest/1.6 km of river. Uncommon in some areas, but very numerous in others and clearly at no risk, despite some local declines in south of range through drainage and reduction in food supply. In view of extensive distribution over some 8 million km<sup>2</sup>, total population seems likely to be at least in hundreds of thousands.

**GEOGRAPHICAL VARIATION** Monotypic, perhaps surprisingly in view of wide range and isolated inland populations.

**MEASUREMENTS** ♂ wing 370–430 mm, ♀ 396–466 mm; ♂ tail 225–277 mm, ♀ 243–292 mm; ♂♀ tarsus 52–66 mm. **Weights** ♂♀ 380 g–1.1 kg; ♂ 600–750 g, ♀ 760 g–1.0 kg.

**REFERENCES** Baker-Gabb (1984), Beehler *et al.* (1986), Bell (1985), Blakers *et al.* (1984), Chatter (1985), Coates (1985), Copper & Copper (1981), Debus (1983a), Gilliard & LeCroy (1966), Hannecart & Letocart (1980), Hollands (1984), Klapste (1985), Marchant & Higgins (1993), Martin (1992), Newgran *et al.* (1993a), Olsen (1991), Olsen & Marples (1992, 1993), Olsen & Olsen (1987a), Olsen *et al.* (1993), Schodde & Tidemann (1989), Somter (1987).

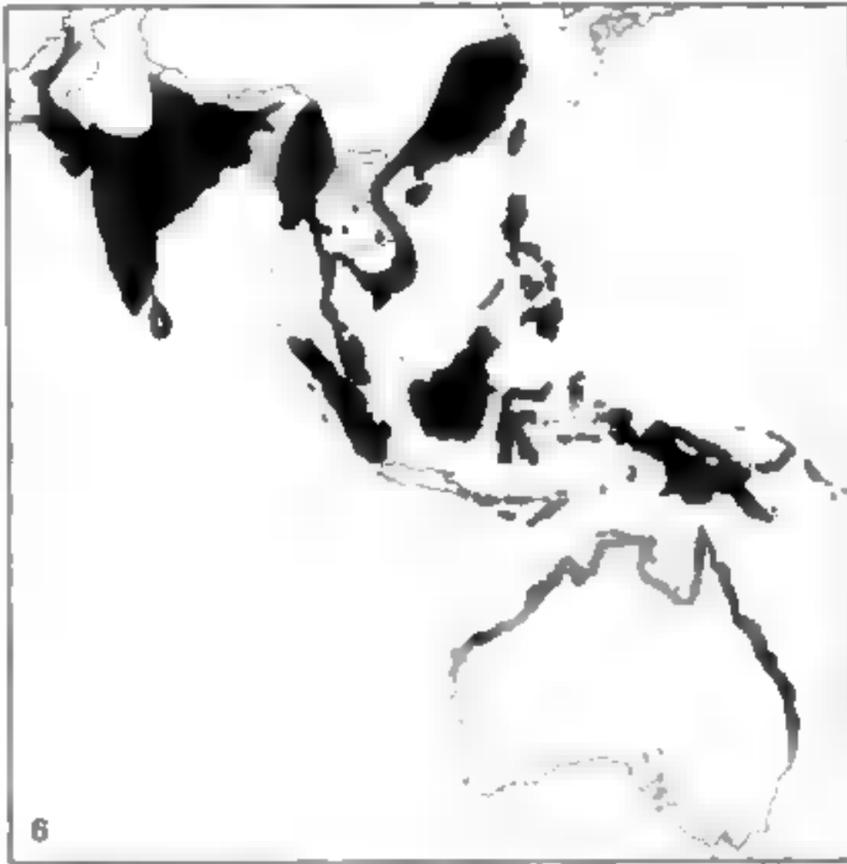
## 41 BRAHMINY KITE *Haliastur indus* (Boddaert, 1783)

Plate 15

Other names: Red- or Rufous-backed/White-headed Kite/Sea-/Fish-eagle, Whistling Eagle/Kite (cf. [40]).

**DISTRIBUTION** Indomalayan and Australasian, very marginally also extreme southeast Palearctic (32°N to 32°S); order 6; extensive distribution and often common, locally even abundant, but in some areas scarce, local or significantly declining. Indian subcontinent and southeast Asia to northern Australasia and western Melanesia; Pakistan (except Baluchistan and North West Frontier Province) and from lower Himalayas south through peninsular India, Sri Lanka, Bangladesh,

Burma and most coastal countries of southeast Asia (increasingly scarce away from coast in, for example, Thailand), thence north into southeast China (including lower reaches of Chang Jiang), and south through Andamans (not Nicobars), Philippines and virtually all Malaysian, Indonesian and other island groups of Greater and Lesser Sundas, Sulawesi and Moluccas to New Guinea, Bismarck Archipelago, Solomons, Louisiades, and northwest, north and east coastal Australia (Caernarvon, West Australia, around north to Mvll Lake, New South Wales).



**MOVEMENTS** Generally sedentary, apart from juvenile dispersal and local wanderings related to rains and drought; but some seasonal shifts in altitude in Himalayas; southern Chinese populations apparently range south into southeast Asia in winter; and some local movements elsewhere, including occasional adults and juveniles inland in Australia, not apparently related to time of year or drought. Dry-season visitor to western islands in Torres Strait. Occasionally wanders to north Vanuatu and, once, Palau.

**HABITAT** Typically, tropical and subtropical coasts and islands of most kinds (estuaries, mangroves, beaches, coral reefs, dunes, saltmarshes, rocks, cliffs, fishing villages and other harbours), but in Indian region and on islands from Greater Sundas to New Guinea (though decreasingly so in mainland southeast Asia) also well inland by rivers, lakes, reservoirs, swamps, marshes, rice paddies and other wetlands, as well as urban rubbish tips, while some populations forage over all lowland habitats, even open grassland or forest far from water. Mostly sea-level to 500 m, more locally to 1,000 m and even, for example, to 1,500–1,800 m in Himalayas and 3,000 m in Greater Sundas.

**FIELD CHARACTERS** Largish kite, strikingly white and chestnut as adult but mostly brown as juvenile, with smallish head, shortish wings, short tail and legs, and weak feet. Perches quite upright, often quite conspicuously and yet unobtrusively on dead or exposed branches of mangroves or other waterside trees or, more briefly, on mudflats, posts, buoys, fishing platforms, ships' masts or rigging, harbour walls, urban buildings; walks easily with more horizontal posture; wing-tips slightly exceed tail-tip (but juvenile wings average slightly shorter). Sexes similar and overlap in size, though female 3–7% larger (different races) and the biggest may be as much as 17% larger and 65% heavier than the smallest male; juvenile very different; partial moult in middle of first year produces intermediate immature stage, but then as adult after complete moult at c 12–15 months.

**PERCHED Adult** Head and neck to mantle, and throat to upper belly and flanks, all white, generally plain in

Australasian region, but more or less finely blackish shaft-streaked in Indomalayan (see Geographical Variation); all sharply demarcated from contrasting bright chestnut of rest of body, wing-coverts, thighs and tail, though last has paler tip which varies from narrow and whitish in west of range to broad and white in east; folded primaries black. (When nesting, female's white lower breast tends to become more discoloured than male's through her major share of incubation and brooding.) **Juvenile** Looks predominantly various shades of brown, darker above and paler on head and underparts; in fresh plumage, ground colour of upperbody and wings can look almost black with pale spotting and scaling on back and smaller coverts, while head and neck vary from densely buff-streaked in Australasian region – so that, with plain buff forehead and lores, whole head looks much lighter apart from dusky mask across ear-coverts – to inconspicuously tawny-streaked, with less obvious mask, in Indomalayan, but over first six months darker plumage fades to brown or rusty-brown and buff markings are reduced by abrasion and lighten to cream; below, mainly brown to rufous-brown with buff to cream streaks, but, especially in Australasian races (where more sharply demarcated), throat and lower belly, thighs and crissum contrastingly plain buff to cream. **Immature (second half of first year to early second)** Mixture of worn and faded juvenile plumage with variable amounts of new white or whitish and red-brown feathers on head, body and lesser and median wing-coverts produces stage that recalls adult pattern, with whitish forehead and throat, mottled cream and pale brown crown, head-sides, neck, mantle and breast to upper belly and flanks, and more or less dull chestnut back, smaller wing-coverts, lower belly, crissum and thighs; greater coverts, flight-leathers and tail mostly not moulted, so these become worn and very faded brown. **Bare parts** Eyes dark brown, sometimes dark red-brown on adult. Adult cere dull yellow, yellowish-white, bluish-white, even pale blue (bill varies from dull bluish or bluish-grey with paler or sometimes yellowish tip in west, through dull yellow or greenish-yellow with bluer base over much of range, and all yellow in Solomons; see Geographical Variation); immature cere whitish (behind dark grey bill, paler at base); juvenile grey (behind slate-grey or greenish-grey bill). Adult and immature legs cream to pale yellowish, dull yellow or greenish-yellow, juvenile ivory-white to cream. **FLIGHT** Medium-sized soaring raptor with small head, bulky-looking body, rather short broad wings slightly pinched in at bases and variably S-shaped trailing edges, and shortish rounded or wedge-tipped tail not so long as wing-bases; wingspan 2.4 times total length. Slow flight with loose beats and rowing action interspersed with glides: glides on slightly to clearly raised wings with up-curved tips, or sometimes slightly arched; soars similarly on raised wings with up-curved tips, but carpal joints pushed forward, fingers and tail well spread; swoops down to snatch food from water or ground, but rarely hovers. **Adult** From above, mainly bright chestnut apart from contrasting plain or finely streaked white head to upper mantle, black fingers and narrow whitish or broad white tail-tip (see Geographical Variation); similar pattern below, including black fingers, but white extends from head to upper belly while undersides of greater coverts, inner primaries, secondaries and tail distinctly

paler than chestnut wing-linings, giving marked two-tone effect. **Juvenile** Very different from adult: mainly shades of brown above, varying regionally and seasonally from almost blackish to rusty-brown, with pale streaking on head to mantle – strongest on pale-looking head with creamy forehead and variable dusky mask and more scaled forewings (see Perched); underbody generally paler brown to rufous-brown with creamy streaks and, especially in Australasian races, well-demarcated creamy-buff throat, lower belly and crissum; blackish fingers and contrasting large pale patch at base of primaries constant, but underwings otherwise very variable (linings vary from creamy with rufous and dusky markings to dark reddish-brown, and secondaries from white-based with faint barring and broad contrasting grey-brown tips to largely dark grey-brown. **Immature** Variable mixture of worn old juvenile plumage (see Perched), so that head, flight-feathers, greater wing-coverts and tail all as juvenile but paler and faded, while mixtures of new chestnut, blackish and whitish feathers on other parts indicate adult patterning distinctively enough.

**CONFUSION SPECIES** Adult and immature unmistakable: no other raptor of comparable range with white or whitish head and breast has dark lower abdomen, or whole wing-linings darker than secondaries. Two species of similar habitats, and with slight overlap in food and behaviour, are White-bellied Fish-eagle [42] (far larger, with tail, axillaries and clear windows all mainly white or whitish) and Osprey [8] (slightly larger, with narrow protruding head, longer and more pointed wings held arched, squared tail, bold black mask and carpal patches, barred quills). But juvenile may be confused with several other species. Black Kite [39] and, in Australia, Square-tailed Kite [35] present little difficulty, being slimmer, with longer wings and tail (latter respectively squared or forked) and quite different patterns both above (including pale covert-diagonals) and below. More significant in Australia and New Guinea are the congeneric Whistling Kite [40] (less compact, with wing-tips falling clearly short of longer tail at rest, and longer and more deeply fingered wings slightly arched in gliding and soaring, all rather variable in plumage but generally paler and with very different underwing pattern); and pale-morph Little Eagle [231] (stockier, with larger head and feathered legs, wing-tips fall short of tail-tip, pattern of underparts not dissimilar but more sharply defined with smaller patagial triangles and less contrasting vent, narrower wings flat or bowed and parallel-edged with pale covert-diagonals on upperside, longer tail squarer-ended and, like flight-feathers, more visibly barred). See also juvenile marsh harriers [100, 101]; in Australia, juvenile and immature pale-morph Black-breasted Kite [36] (much larger, with longer wings held upswept, bold white windows, stubby squared tail); and in southern Asia, Common Buzzard [203] and dark-morph Booted Eagle [230].

**VOICE** Usually silent except when nesting. Most characteristic sound, much used between pair-members, both perched and in flight, is plaintive descending mew or bleat, variously compared to cat, lamb or human baby. In aggressive situations, this becomes loud, harsh, peevish squeal, *peee-yah*, not unlike Black Kite [39] in tone but more wheezing in quality. Also whistle like first part of call of Whistling Kite [40].

**FOOD** Very varied: proportions of items also differ considerably between populations. Opportunist scavenger, often associated with harbours and other watersides, but also road verges and rubbish tips. Thus, typically, offal and garbage from boats and tips, dead or stranded fish, roadkills and other mainly small carrion; in India, rarely also joins vultures at larger carrion. But also many live foods, including crabs and other crustaceans, some amphibians and small reptiles, probably mainly sick or injured small mammals and birds, sometimes young chickens and, commonly, small fish and insects. Fish taken from surface of shallow seas, slow rivers or coastal pools. Insects perhaps most usually in the form of swarming termites and ants, or orthopterans and other larger species disturbed by grass fires or, sometimes, agricultural machinery; but, at least in Australia, also gleanes insects from trees, agilely manoeuvring between branches. Forages mainly by soaring, or quartering low above ground or water, but often still-hunts from water-side perches and will sometimes forage on ground. Smaller prey may be eaten on wing. Recorded catching moths by night at artificial light in New Guinea, and fishing regularly in glow of marina lights in north Queensland. Sometimes harries other smaller raptors and, particularly, gulls, terns and large wading birds to make them drop or disgorge food, but is more often itself pirated by Black Kites [39] and corvids.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or, at most, in family parties, but loose gatherings of up to 26 recorded at roost in Australia and up to 35 at abundant insect food source in New Guinea. Single and mutual high-soaring regular in breeding season, with some calling, though generally much less noisy than Whistling Kite [40]; talon-grappling and whirling spin apparently rare, but pair may make long twisting dives when soaring together. In advertising display, usually above nest, soaring male will climb at speed, sometimes hang into wind, then dive with folded wings for 30–100 m before levelling out and perhaps repeating, but evidently no prolonged roller-coaster performance.

**BREEDING** Much variation over wide range, but mainly dry season in tropics, more variable near equator, and mid winter onwards elsewhere: December–June in Indian region, January–July in mainland southeast Asia and Borneo, February–July in Philippines, any months in Java and Sulawesi (mostly May–October), June onwards in New Britain, April–October in north Australia grading to July–December farther south. Untidy nest of sticks, grass, seaweed and flotsam, 30 cm across when new, increasing to 60–75 cm with repeated use, and 15–20 cm deep; lined with twigs, and variously with wool, rags and other rubbish where associated with people, more with grass, green leaves, pieces of bark, lichens and food remains (fish bones, pieces of crab) where not; mostly at 6–50 m in fork of tall tree (well hidden in foliage or quite open among dead or bare branches), or as low as 2–8 m in mangroves (where may be only just above high-water mark), but occasionally on artificial structures (ruined building, lighthouse, transmission tower, jetty tower). Clutch most often 2 (1–4). Incubation variously 28–35 days. Fledging variously 40–56 days; dependent on adults for further 2 months.

**POPULATION** In Australia, where distribution more

or less linear along some 11 million km of coast and tidal river, the few recorded densities vary from 1 pair/3.3 km (6 pairs in 20 km) to 1 pair/37 km (6 pairs in 223 km); applied evenly, these would suggest Australian population in range 300–3,000 pairs. Over much of rest of distribution, totalling well over 5 million km, the species also breeds far inland and an overall mean density of only 1 pair/100 km would give a six-figure total. Significant declines away from coast in mainland southeast Asia and, most dramatically, throughout Java, where variously attributed to overuse of pesticides, loss of habitat, persecution and, possibly, improved urban hygiene resulting in less available food. Some of these factors have also applied in New South Wales, where range has contracted northwards since European settlement, and elsewhere in eastern Australia, where more recent decreases attributed to former use of DDT and disturbance of habitat, but in general co-exists well with human beings and gains from their more traditional ways of life.

**GEOGRAPHICAL VARIATION** Four races.

*H. i. indus* (Indian region, with Sri Lanka and Andamans, through mainland southeast Asia to China and Thailand, but intergrades into next in peninsular Malaysia) Large; white head, mantle and breast streaked blackish, narrow paler tail-tip; juvenile rather uniform brown with tawny streaks on head and breast, less obvious 'mask' behind eyes across ear-coverts.

*H. i. intermedius* (Malaysia, Philippines and all suitable islands of Indonesia from Sumatra to Flores and from Borneo to Sulawesi, where begins to intergrade into next through western Moluccas and eastern Lesser Sundas) Largest in west, grading to smaller in east; blackish streaking on adult head and breast thinner (confined to shafts); juvenile intermediate between *indus* and *girrenera*.

*H. i. girrenera* (rest of Moluccas and eastern Lesser

Sundas from about Timor, through New Guinea and associated islands to Australia) Smallest, but averaging larger in Australia than in New Guinea; adult head and breast plain white, broad white tail-tip, bill more or less dull yellow with grey base; juvenile looks pale-headed with dense cream streaking and contrasting dark mask, and more creamy-bellied.

*H. i. flavirostris* (Solomon Islands, intergrading with previous in Bismarck Archipelago) Averages slightly larger again; plumages very like *girrenera*, apart from adult occasionally showing shaft-streaks on back of head, but adult's bill heavier (not longer, but deeper and 'more aquiline') and all yellow.

**MEASUREMENTS** *H. i. indus* ♂ wing 359–394 mm, ♀ 379–403 mm; ♂♀ tail 180–207 mm, tarsus 51–59 mm. *H. i. intermedius* ♂ wing 375–398 mm, ♀ 405–425 mm; ♂♀ tail 203–215 mm, tarsus 49–55 mm. *H. i. girrenera* ♂ wing 343–378 mm, ♀ 353–403 mm; ♂♀ tail 153–218 mm, tarsus 50–58 mm. *H. i. flavirostris* ♂ wing 357–384 mm, ♀ 357–390 mm; ♂♀ tail 181–189 mm, tarsus 54–62 mm. **Weights** *H. i. indus* ♂♀ 520–700 g. *H. i. intermedius* ♂ 587 g (one), ♀ 566 g (one). *H. i. girrenera* ♂ 409–610 g, ♀ 434–673 g. *H. i. flavirostris* ♂ 560–650 g (three), ♀ 495–520 g (two, also one at 900 g: B&A).

**REFERENCES** Ab & Ripley (1978), Baker (1955), Beehler *et al.* (1986), Bell (1985), Blakers *et al.* (1984), Bregulla (1992), Buckingham *et al.* (1995), Cheng Tso-luin (1987), Coates (1985), Condon & Amadon (1954), Coomans de Ruiter (1947), Cupper & Cupper (1981), Debus (1992), Dickinson *et al.* (1991), Draffan *et al.* (1983), Etchécopar & Høe (1978), Henry (1998), Hollands (1984), King *et al.* (1975), Lekagul & Round (1991), Mackinnon & Phillipps (1993), Marchant & Higgins (1993), Medway & Wells (1976), Meyburg & van Balen (1994), Olsen (1991), Olsen & Marples (1993), Olsen *et al.* (1993a/b), Roberts (1991), Schodde (1977), Schodde & Tidemann (1988), Smith (1992), Smithies (1981, 1986), Thair (1977), van Balen (1994), van Balen *et al.* (1993), van Marle & Vrous (1988), Warne (1990), Wells (1985), White & Bruce (1986).

## Accipitridae (e: fish-eagles and fishing-eagles)

### 42 WHITE-BELLIED FISH-EAGLE

*Haliaeetus leucogaster* (Gmelin, 1788)

Plate 15

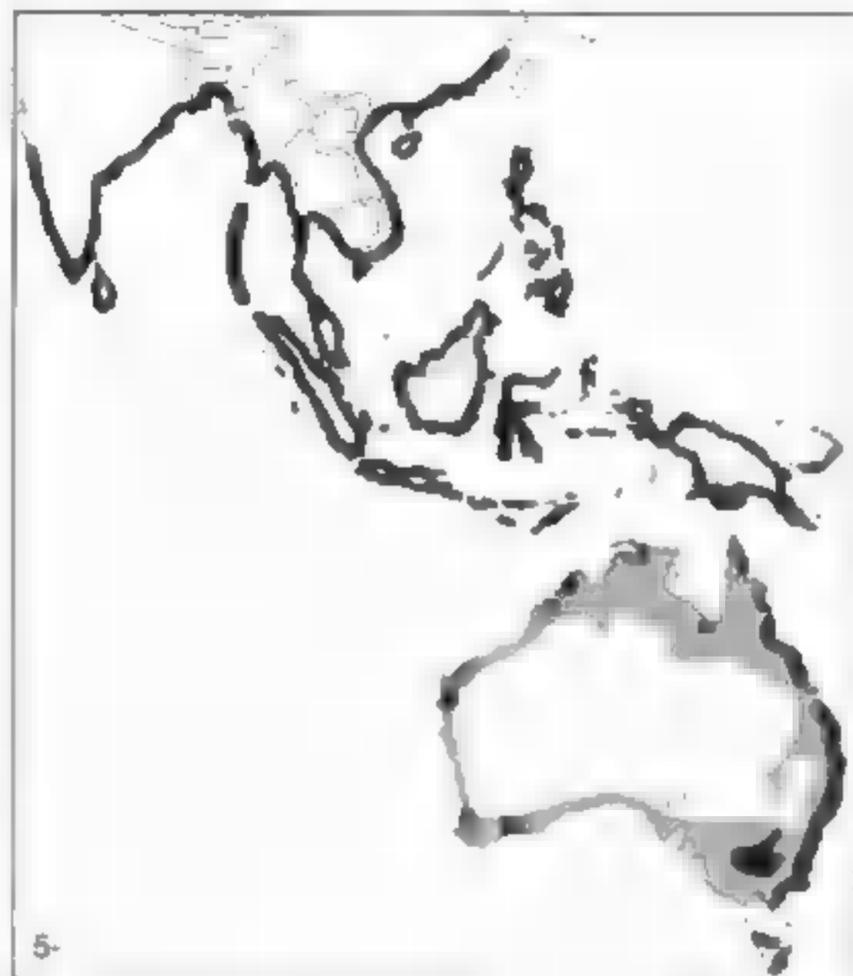
Other names: White-bellied Sea-eagle, White-breasted Fish-eagle or Fish-hawk, Grey-backed Sea-eagle

**DISTRIBUTION** Indomalayan and Australasian (26°N to 44°S); order 5-; extensive distribution and, for size of bird, generally relatively common, but declining and now uncommon to rare in Thailand and some other parts of mainland southeast Asia, India and southeast Asia through Wallacea to New Guinea and Australia; mainly coasts and large waterways from west India (near Bombay) and south China (about Fuzhou) through all coastal countries of mainland southeast Asia (plus Laos), and virtually all Indo-Malaysian, Indonesian and other island groups from Laccadives, Sri Lanka, Andamans, Nicobars and Greater Sundas in west to Hainan, Taiwan,

Philippines, New Ireland, Nissan, New Britain and Louisiades in east, south around Australia to Tasmania.

**MOVEMENTS** Adults generally sedentary, but forage over wide areas and sometimes nomadic in response to food shortages and, among freshwater populations, drought. Juveniles and immatures may disperse considerable distances: one from South Australia moved 3,000 km to Fraser Island (Queensland); in northwest India one old record 450 km north of Bombay and 80 km inland.

**HABITAT** Coasts and islands, tidal estuaries, more locally rivers and lakes, ranging over adjacent wooded and open country. Mostly sea-level to 900 m, but locally to 1,500 m and recorded to 1,700 m on Sulawesi.



**FIELD CHARACTERS** Largish but relatively slender fish-eagle, as adult mainly white and dark grey, with strong bill, narrow head on longish neck, long wings, short wedge-shaped tail, and shortish legs with unfeathered tarsi and strong feet. Perches upright and conspicuously on dead or other open branches, fishing platforms and stakes, waterside posts and logs, rocky islets and cliff ledges, or more horizontally on open ground; wing-tips reach or exceed tail-tip. Sexes similar, but female almost always larger (up to 20%) and often much heavier (up to 120%); juvenile very different, but light and dark pattern already something like adult by third year and followed by two to three years of subadult stages.

**PERCHED Adult** Head, neck, distal half of tail, and whole underbody and thighs white; back and wing-coverts dark brownish-grey; primaries black; tail-base dark grey to blackish. **Juvenile** Front and sides of head mainly creamy, with dark brown stripe behind eyes, otherwise dark brown above, cream-streaked from rear crown to hindneck, scaled on back and shoulders, and broadly fringed to form mid-wing panel on median and inner greater coverts; tail white at base, shading into broad blackish subterminal band; underbody all dark brown at first. During first year, creamy feather-tips above wear off, leaving head more uniformly buff, back paler and greyer-brown and wing-coverts more evenly dark, while crissum and then belly, flanks and lower breast wear to paler rufous-buff in contrast to darker chest and thighs. **Second-year** Above, not unlike juvenile, though with more variegated mix of pale old and darker cream-edged new feathers, but head and underbody mostly paler whitish-buff in contrast to mottled buff to rufous-buff chest and more rufous-buff thighs, while tail now largely white with thinner subterminal band shading from grevish to dark brown near tips, especially towards corners. **Third-year** Head and underbody now largely creamy apart from whitish-streaked buff chest and buff thighs, while tail largely white apart from variable blackish mottling towards base. **Subadult** Increasingly less brown and more grey above and white below, with

more uniform black at base of tail. **Bare parts** Eyes generally dark brown to blackish-brown at all ages, but newly fledged juvenile can have light brown outer rings. Cere and bare lores blue-grey, or juvenile sometimes duller grey. Legs creamy-white to whitish-grey, occasionally tinged yellow-buff or pink.

**FLIGHT** Large raptor with long broad wings; narrow head on well protruding neck and short wedge-shaped tail respectively project slightly less and slightly more than width of pinched-in wing-bases; long inner secondaries and shorter outer secondaries and inner primaries give impression of hulging S-shape to trailing edges with narrowing wing-tips (like others of this genus, juveniles have even longer inner secondaries, producing more pinched-in wing-bases, and all secondaries more pointed, so same shape emphasised and with serrated trailing edges); wingspan 2.6 times total length. Powerful shallow beats with measured rowing action, interspersed with occasional short glides on slightly raised wings; soars with wings more clearly raised in stiff V and thrust slightly forward. **Adult** Above, mainly dark grey (blackier at tips of primaries and base of tail) but for white head, neck and distal half of tail; below, white head, body, wing-linings and tail-tip contrast with blackish flight-feathers, greater coverts and tail-base. **Juvenile** Uniformly serrated trailing wing-edges; upperbody and forewings mainly dark brown with pale streaks and scaling, including light panel on median coverts, cream-spotted rump, and whitish uppertail-coverts, last two enlarge effect of white base to tail, which otherwise has contrasting broad dark subterminal band; grey-brown inner primaries clearly paler between black wing-tips and blackish secondaries; below, these inner primary-windows show up as white, even though usually black-speckled or streaked, forming distinctive pattern along with pale diagonal between mainly rufous-buff wing-linings and dark diagonal of carpal arc and dusky-tipped greater coverts, which joins variably sized white patch on axillaries. **Second-year** Trailing wing-edges now mainly even, but some old, pointed, juvenile secondaries stick out; much as juvenile above, but head paler whitish-buff, tail mainly white with much thinner subterminal band most obvious at corners, and back and forewings more contrastingly mottled through mix of old faded and new dark but light-edged feathers; below, head and underbody largely whitish-buff except for darker thighs and mottled chest, while undertail looks all white apart from traces of black spotting appearing at base, but underwings still like juvenile except for paler linings and bases to secondaries, further emphasising dark diagonal extending from carpal arc across greater coverts. **Third-year** May still have odd juvenile secondary breaking smooth lines of trailing wing-edges; head now uniformly creamy-white, and tail largely white apart from variable blackish mottling towards base (often uneven and sometimes quite extensive); otherwise, still much as second-year above, but even more mottled and blotched; underbody now uniformly creamy-white with only streaky buff chest and buff thighs; linings also largely pale buff and more white on bases of secondaries, still further emphasising dark diagonal along tips of greater coverts. **Subadult** Largely grey on back and wing-coverts by fourth or fifth year, and black at base of tail more or less complete, but often some buff retained on thighs and, particularly,

chest and wing-linings, and usually still white at bases of undersides of flight-feathers.

**CONFUSION SPECIES** Adult and older, whiter immatures (third year on) unmistakable: only other white-headed and white-breasted raptors of comparable range are adult Brahminy Kite [41] (far smaller and mainly rufous, including belly and most of wings and tail) and adult Egyptian Vulture [54] (also smaller, much whiter above, narrower and more pointed wings). (In India and southeast Asia, high overhead in strong light, some Gyps vultures, e.g. Long-billed [58], and some eagles, e.g. Booted [230] and pale juvenile Greater Spotted [219], can appear to have white body and wing-linings contrasting with dark flight-feathers, but all have dark tails.) Juvenile and second-year White-bellied also easily distinguished from all stages of two other *Haliaeetus* in west and north of Asiatic range, Pallas's [46] and White-tailed [48], by combination of white-based or mainly white tail and white windows and axillaries; in eastern Bismarck, same applies to Sanford's [43]. In Australia, this combination also rules out Wedge-tailed Eagle [225] (which more uniformly dark, with feathered legs, longer tail and narrower, more parallel-edged wings), while much smaller Black-breasted Kite [36], despite its bold white windows, has stubby tail, more evenly shaped wings, no white in axillaries, and obvious differences in flight and behaviour.

**VOICE** Heard most in pre-laying period, especially in early morning and towards dusk, but may be uttered at any time of year and even during lighter nights. Loud, far-carrying and somewhat goose-like honking *ank...ank...ank...*, and still faster and more duck-like nasal *ka...ka...ka...*. In courtship, frequently used in aerial displays, during approach to nest and, often as irregular duet, when pair perched together: male call then higher and faster. Harsh discordant croak of alarm when nest threatened.

**FOOD** Opportunist feeder on wide range of mainly, but by no means entirely, aquatic vertebrates, including reptiles, fish, birds and mammals, also crustaceans, and any fish-offal, floating refuse, tideline carrion or human waste from rubbish dumps. Reptile prey chiefly sea-snakes and small turtles and tortoises; birds include many shearwaters, petrels, gulls, terns, and young of herons, cormorants and other larger colonial waterbirds, as well as coots, grebes, ducks, geese, and various landbirds, sometimes including chickens; among mammals, bandicoots, wallabies, rodents and occasional domesticated species. Often still-hunts from open waterside perch, or slow-circles above surface at varying heights, or sails along at 10–20 m above shoreline, before planing down or stooping to grab prey, usually in one foot, often barely breaking surface but occasionally becoming almost completely submerged. Also pirates food from seabirds and other raptors (including Ospreys [8], *Haliastur* kites [40,41] and other White-bellied Fish-eagles); snatches fruit-bats *Pteropus* from tree-roosts; harries flocks of waterbirds, especially Coots *Fulica atra*, to separate out suitable victim; hunts co-operatively as pair; forages on rubbish dumps; and has followed cane-harvesters and dolphins for prey disturbed. Prey may be swallowed in flight if small or, more usually, taken back to favoured perch; carrion often eaten on ground.

**SOCIOSEXUAL BEHAVIOUR** Often in pairs, mating for life and using nest as base through year; juveniles stay with adults for up to 3–6 months. Up to five adults recorded together; small gatherings up to about 14 are mostly immatures, and 45 recorded at rubbish tip in Western Australia. Duets with head pointing up. Aerial displays, usually with much calling, include mutual low- and high-circling, twisting and turning chases, dives and somersaults, and periods of parallel-flight leading into talon-grappling and cartwheeling.

**BREEDING** Usually solitary, sometimes 2–4 pairs on small island. Varies from October–March in India through December–May in southeast Asia, Philippines and Borneo to, south of equator, May–November in New Guinea and north Australia and June–December farther south. Huge stick nest, 1.2–1.5 m across, up to 3 m with repeated use, and 0.5–1.8 m deep, lined with green leaves, grass and seaweed, at 3–50 m in mangrove or tall forest tree, at 9–70 m on cliff or stack, or in low bushes or on ground on offshore islet. Clutch 2 (1–3). Incubation probably in range 35–42 days. Fledging 65–70 days.

**POPULATION** With essentially linear distribution of probably well over 100,000 km (Australia alone has coastline of nearly 20,000 km), any calculation of numbers based on area would be pointless. Local averages for distances between active nests in Australia have included, for example, 1 pair/8–10 km, 1 pair/40 km and 1 pair/65 km: if the middle of these three were applied over Australian coasts and rivers as a whole, something in excess of 500 pairs might be expected there, and well over 2,500 pairs across the entire range, but Tasmania alone, with coastline of under 1500 km, has 80–100 pairs and in Indomalaya 2–4 pairs may nest on one small island. Thus, above calculations may well be serious underestimates, especially considering the number of smaller islands, through Malaysia, Indonesia, Philippines and Papua, where this species is generally regarded as common. Therefore, including immatures and non-breeders, a population running into five figures seems a reasonable expectation. There have been declines in Thailand (now 'uncommon...much reduced') and elsewhere in mainland southeast Asia and, at other end of the range, in southern Australia, due to such causes as human disturbance, shooting, poisoning, loss of breeding sites with clearance of waterside forest and, perhaps, pesticides and other pollution.

**GEOGRAPHICAL VARIATION** Monotypic. Replaced in Bougainville and Solomon Islands by Sanford's Fish-eagle [43], with which forms a superspecies.

**MEASUREMENTS** ♂ wing 526–589 mm, ♀ 581–633 mm; ♂ tail 208–278 mm, ♀ 263–298 mm; ♂♀ tarsus 85–117 mm. **Weights** ♂ 1.8–2.9 kg, ♀ 2.5–3.9 kg.

**REFERENCES** Abbott (1982), Ali & Ripley (1978), Baker (1935), Bilney & Emison (1983), Beehler *et al.* (1986), Blakers *et al.* (1984), Boekel (1976, 1980), Bravery (1970), Breeden & Wright (1990), Brown (1976b), Calaby (1951), Cheng Tso-hsin (1987), Coates (1985), Cooper (1980), Crawford (1972), Copper & Copper (1981), Czechura (1984b), Dennis & Lashmer (1996), Dharmakumarsinji & Lavkumar (1956), Dickinson *et al.* (1991), Draffan *et al.* (1983), Emison & Bilney (1982), Eichécopar & Hùe (1978), Falkenberg *et al.* (1994), Favoloro (1944), Fleay (1948), Ford (1965), Gilliard (1966), Gilliard & LeCroy (1996), Green (1959), Henry (1998), Hollands (1984),

King *et al.* (1975), Lekagul & Round (1991), Leonard (1995), Lindgren (1972), MacKinnon & Phillipps (1993), Marchant & Higgins (1993), Meyburg & van Balen (1994), Medway & Wells (1976), Mooney & Wiersma (1995), Olsen & Marples (1993), Olsen *et al.* (1993a/b), Rhodes (1959), Saunders

(1957), Schodde & Tiedemann (1988), Schulz & Cowle (1988), Smith (1985), Smith (1989), Smithies (1981, 1986), Stokes (1996), Storr (1966), Tarr (1962), Tollan (1989), van Balen (1994), van Marle & Vooys (1988), Wells (1999), Wells & Hooper (1987), White & Bruce (1986), Wiersma (1995).

## 43 SANFORD'S FISH-EAGLE *Haliaeetus sanfordi* Mayr, 1935

Plate 15

Other names: Sanford's Sea-eagle, Solomon Fish-/Sea-eagle, Brown Fish-/Sea-eagle

**DISTRIBUTION** North Australasian (5°S to 11°S); order 3; locally common. Endemic to Buka, Bougainville, and virtually all of Solomon Islands southeast to Makira [San Cristobal].



**MOVEMENTS** Apparently more or less sedentary. Evidently long isolated and, though occurring on islets and reefs off shore, never recorded outside known range.

**HABITAT** Forested coasts, lakes, and both lowland and montane forest well inland; some coastal birds forage far inland and there are pairs that appear to have entirely inland ranges. Sea-level to at least 1,500 m.

**FIELD CHARACTERS** Mid-sized and lightweight fish-eagle, brown, rufous and pale creamy as adult, with strong bill, longish neck, rather short bare legs; wings generally shorter and tail longer than on related White-bellied [42]. Perches upright, usually on tree, or stands hunched on ground; wing-tips fall short of tail-tip. Sexes similar and overlap in size, though female may be up to 11% larger and, at least seasonally, perhaps much heavier; juvenile separable and, as with other fish-eagles, there follows a series of immature plumages grading slowly from one to another and probably not fully adult until at least fifth or sixth year.

**PERCHED Adult** Golden-tawny to creamy head, with fine black shaft-streaks, stands out against blackish-brown back and wings, blacker tail with pale tip, and dull rufous underparts; no yellow on bare parts. **Juvenile** Not dissimilar, but longer-tailed, generally browner and less pale-headed, with whitish tips to feathers of back and wing-coverts (these becoming less conspicuous with wear) and grey-white streaks on otherwise darker crown, nape and underparts. **Immatures (second- to fifth-years)** More like juvenile than adult until at least third year (?), but can become paler, less obviously streaked, and more patchy, from sunlight, abrasion, and retention of individual feathers through two or three moults. **Bare parts** Adult eyes tawny-brown to brown, bill and cere grey-brown to greyish-horn, legs whitish-grey to whitish-horn; juvenile perhaps darker.

**FLIGHT** Largest raptor in Solomons, with well projecting head, long broad wings, and wedge-shaped tail (though actually smaller, slimmer and shorter-winged than other typical fish-eagles). Powerful shallow beats, not necessarily slow, with short glides on stiffly raised wings; also soars with wings in shallow or more prominent V and tips upswept. **Adult** All dark above but for paler head and thinly pale-tipped black tail; below, rufous-washed underbody lighter than underwings, which have black tips and carpal arcs not particularly conspicuous against paler-based primaries and rufous-and-black mottled linings. **Juvenile** Browner and less clearly pale-headed, with streaked underparts, darker and more mottled lower abdomen, and whitish axillaries, but still pale-tipped blackish tail; at least in fresh plumage, should look slightly spotted above.

**CONFUSION SPECIES** Large size and fish-eagle character readily distinguish this from all other indigenous raptors of Bougainville and Solomons, but beware that general plumage pattern of immatures not so different from much smaller juvenile Brahminy Kite [41]. Moreover, two other species with broadly similar colouring could conceivably occur as vagrants to these little-studied islands: Whistling Kite [40] and, more particularly in view of its close relationship and breeding range separated by under 200 km of sea, juvenile White-bellied Fish-eagle [42] (white tail shading to broad pale brown tip, less streaked underbody, different underwing pattern).

**VOICE** Noisy at least in breeding season. Main call described as high-pitched honking *ch-ch-ch...*, *ya-ya-ya...* or *guak-guak...*

**FOOD** On coasts feeds mostly on fish and carrion, but inland takes arboreal mammals (e.g. phalangers, fruit-bats) and medium-sized landbirds (primarily pigeons). Various recorded gliding just above beach-fringing coconuts, scavenging along tideline, feeding on dead shark, regularly quartering area of river mouth, and carrying fish. Still-hunts from prominent perch or, perhaps more often, forages in low flight along coastline or over tree canopy or ground. Frequently pirates fish from Ospreys [8]. Grabs arboreal prey from forest canopy.

**SOCIOSEXUAL BEHAVIOUR** Solitary, or in pairs or family parties. Like other fish-eagles, calling and duetting evidently form significant part of displays, both perched and in flight; sometimes at least, head thrown up to point skywards. High-circling by one bird or pair common, but very few other aerial manoeuvres on record: in advertising display, a bird rocked from side to side with wings held in deep V and legs dangling, calling continuously; one mid-June observation of bird circling above and periodically swooping at its mate, which was carrying branch in talons.

**BREEDING** Little information on season, but courtship reported in June and August. Probably nests mainly in trees, possibly including mangroves. No data on incubation or fledging periods.

**POPULATION** Now categorised as 'vulnerable', just possibly even 'endangered'. In 1970s the species was 'widespread' on Bougainville and 'fairly common' in parts of Solomons, but it is known to have declined on several larger islands, such as Guadalcanal and Malaita, through human activities: deforestation and other habitat disturbance, perhaps overfishing and pollution from logging, and more recently (in defiance of traditional taboos) killing for food or sport and, locally, because of a perceived threat to poultry and domestic animals. Few data on densities, but in 1950s four pairs recorded on the 12km<sup>2</sup> of Three Sisters, off Makira, while in 1990s minimum territory of 10km<sup>2</sup> estimated on Nduke (Kolombangara). The total landmass of all the islands is around 40,000 km<sup>2</sup>, but, in view of the species's preference for coastal areas and its relative scarcity inland, as well as the effects of deforestation and other human interference, the population seems

more likely to be in the middle to upper hundreds than in thousands.

**GEOGRAPHICAL VARIATION** Monotypic. Sometimes treated as local race of the widely distributed White-bellied Fish-eagle [42] of Indomalaya and Australasia, which it replaces geographically, the very different adult then being explained as paedomorph with 'immature' feathering and no development of any of the white areas characteristic of other mature fish-eagles. But adult Sanford's, which is relatively longer-tailed and shorter-winged, has very distinct plumage that lacks the spotting common to juveniles of both species, so the two are better considered as *allospecies* forming a *superspecies*.

**MEASUREMENTS** ♂ wing 519–547 mm, ♀ 535–575 mm; ♂♀ tail 245–295 mm, tarsus 91–103 mm. **Weights** ♂ 1.1 kg (one); ♀ 1.3–2.7 kg.

**REFERENCES** BirdLife International (2000), Blaber (1990), Buckingham *et al.* (1995), Cain & Galbraith (1956), Coates (1985), Fentzloff (1989, 1990), Filewood (1960), French (1957), Hadden (1981), Mair (1935, 1936, 1945b), Olsen (1994), Olsen (1997), Schodde (1977), van Oosteren & Wyant (1988), Webb (1992, 1997).

## 44 AFRICAN FISH-EAGLE *Haliaeetus vocifer* (Daudin, 1800)

Plate 16

Other names: Fish Eagle, River Eagle

**DISTRIBUTION** Afrotropical (17°N to 35°S); order 6; generally common to abundant. Much of sub-Saharan Africa: extreme south Mauritania, southern parts of Mali, Niger, Chad and Sudan, and Ethiopia, south almost throughout to southernmost South Africa except in desert and other waterless areas



**MOVEMENTS** Adults usually sedentary, but locally somewhat nomadic in response to drought, floods and food supply. Immatures wander far from water and may travel some distance: one ringed in northeastern South Africa moved 200 km, and an influx of 52 immatures at Lake Ngami, Botswana, in 1969 could have involved

journeys of up to 380 km. [A record of three individuals of this species in south Sinai, northernmost Egypt, in November 1967 (Cramp & Simmons) has more recently been regarded as unacceptable (Shirihai 1996).]

**HABITAT** Wide variety of aquatic habitats: large fresh-water lakes, rivers, floodplains and stocked dams in particular, but also swamps, trout streams and alkaline lakes and, on the coast, creeks, estuaries and mangrove lagoons, preferably with reasonably calm waters. Juveniles and other immatures may be seen flying, and occasionally roosting or carcass-feeding, while making their way across dry regions: these can be an identification problem for the unwary. Sea-level to 4,000 m, but most numerous below 1,500 m.

**FIELD CHARACTERS** One of the smallest and most compact of fish-eagles, but still a large raptor: white, black and rufous as adult, with strong bill, laterally flattened head, stout unfeathered legs, long wings and short tail. Spends most of time perched, up to 85–95% of day in productive habitats; wing-tips exceed tail-end, but fall just short on juvenile, tail of which is longer by 2–3 cm. Sexes similar, but female 9% larger; juvenile distinct and other immature stages distinguishable.

**PERCHED Adult** Unmistakable, with white head, neck, mantle and breast (female's white chest possibly less deep in centre and squarer at corners than male's more rounded area of white), and white tail, contrasting with chestnut shoulders, belly and thighs, and black back and wings. **Juvenile** Quite different, and rather scruffy-looking in various shades of black-brown to rufous-brown edged and mottled with white (black-brown juveniles possibly males): when perched, best recognised by pale cheeks contrasting with dark cap, white streaks on mantle and wings, white lower breast-band streaked

with brown and, if visible, mottled grey-white tail with broad brown tip; grey facial skin, cere and legs. **Second-year** By second year head and breast mainly whitish with some dark streaks and often conspicuous dark eyebrows, and rest of underparts mottled brown, grey-brown and white; tail whiter with thinner dark tip. **Third-year** Head and breast white with dark streaks, belly and wing-linings show mixture of chestnut and black, and tail white or faintly dark-cornered. **Fourth-year** As adult but for some dark mottling in chestnut areas; probably not fully adult until fifth or even sixth year. (Like other fish-eagles, moult more or less continuous after end of juvenile stage at about one year old, so many plumages are mixtures. Adult's white head, chest and, especially, mantle sometimes have fine black shaft-streaks, but no evidence that this is connected with age.) **Bare parts** Adult eyes pale yellow-brown to hazel, juvenile pale yellow. Adult facial skin and cere yellow, juvenile grey, later becoming pinkish in third year and then dirty yellow in fourth-fifth. Adult legs fleshy-white to dull yellow, juvenile grey to fleshy-white.

**FLIGHT** Large raptor, with large head, small narrow bare facial area, short rounded tail, long broad wings (but narrower-tipped and less parallel-edged than some other fish-eagles); wingspan 2.8 times total length. Quite slow beats interspersed with glides on level wings but carpal joints thrust slightly forward; soars with wings flat or raised in slight dihedral. **Adult** Unmistakable, with white head to chest, and tail, chestnut abdomen and wing-linings, and black back and flight-feathers. **Juvenile** From below is basically dark but for paler-mottled wing-linings, streaked white breast-band, whitish tail-base, light windows on inner secondaries, and whiter windows at bases of primaries; even tail pattern is diagnostic.

**Immatures** By second year, wing pattern broadly similar (though linings paler, secondary-windows whiter, primary-windows smaller, and trailing edges ragged owing to retention of some juvenile secondaries), but tail whiter with narrower terminal band, and head and body much paler with variable streaking. By third year, abdomen and wings look mainly dark, but for white-based outer primaries.

**CONFUSION SPECIES** Adult could only momentarily be confused at very long ranges with adult Palmnut Vulture [52] (white where fish-eagle is chestnut, and flight pattern quite different), but the two immatures are sometimes misidentified, despite Palmnut's small head, extensively bare face, paler forehead and reversed tail pattern. Confusion of pale second-year fish-eagle with Osprey [8] arises only because of shared habitats and (actually rather different) fishing behaviour.

**VOICE** Very noisy. Usual cry, among the most characteristic and evocative sounds of African watersides, is loud clear *wrah kyau-kow-kow* (yelp followed by ringing laugh, rather reminiscent of very loud Herring Gull *Larus argentatus*); this is used both perched and in flight, always with the head thrown back (crown almost touches mantle on second syllable) and then forward again, and is so far-carrying that it is clearly audible even when a flying bird is so high and distant as to be an almost invisible tiny speck. Often used in duetting (when male's higher-pitched treble sounds shriller than female's mellower contralto), as well as in pair contact and

territorial defence; juveniles do not produce this sound, but immatures from 2-3 years old have hoarser version. Other common call in breeding season is anxious barking *kook-kook*, again rather gull-like, near nest.

**FOOD** Mainly fish, also birds; occasional records of mammals (hyaenas, monkeys), reptiles (crocodile hatchlings, terrapins, monitor lizards), amphibians (bullfrogs), insects; rarely carrion. Fish mainly surface-feeders (or, on coast, eels and other coral-dwellers stranded at low tide) weighing 200-500 g, but also to 1 kg and more and even occasionally to 4.2 kg; can lift up to 1.5 kg easily and, once airborne, can carry up to 2 kg or more for considerable distances up into trees, but most prey of 2-3 kg has to be dragged through water to shoreline; fish up to 3.65 kg have been splashed and paddled to land. Bird prey includes many nestlings (especially of colonial herons, storks, ibises, spoonbills, flamingos, cormorants, Whiskered Terns *Chlidonias hybridus*) and ducklings and other young waterbirds, even occasional adults up to size of grebes, ducks and coots; rarely recorded killing cormorants, herons and flamingos, and doves. Young fish-eagles twice recorded swooping down and pulling off weaver nest in reedbed, returning to perch and tearing it open to eat contents (other similarly treated nests on ground in the area suggested regular habit). In northeast Namibia, bullfrogs commonly eaten. Unless food is very scarce, adults seldom take carrion, other than occasional floating dead fish, though one recorded feeding on roadkill snake; but immatures may feed with vultures or Tawny Eagles [220] at mammal carcasses well away from water. Commonly still-hunts with glide down from waterside tree or emergent post, or sometimes makes short forays out over the surface, occasionally hovering briefly, and drops in with shallow plunge when fish sighted, throwing both feet forward at last moment (see fig. 27), though seldom immersing like Osprey [8]. Also markedly piratical, harrying pelicans, cormorants, herons, storks, kingfishers, Ospreys, and even other African Fish-eagles until they drop their prey (especially females robbing males). Although, on average, only one in seven or eight fishing attempts successful, usually spends less than 10 minutes a day (hardly more than 1% of daylight) fishing, except when feeding young.

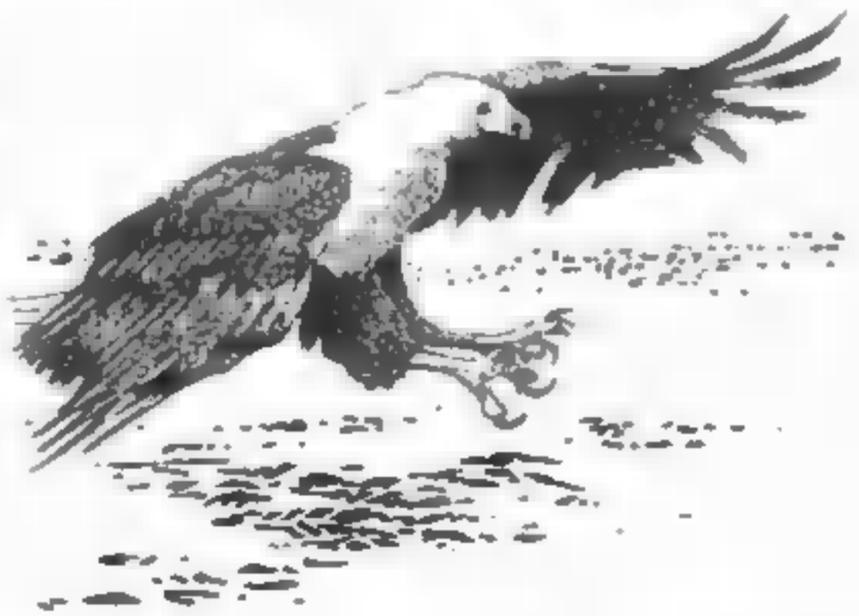


Fig. 27. African Fish-eagle *Haliaeetus vocifer* (44) swooping on fish and throwing feet forward at last moment.

**SOCIOSEXUAL BEHAVIOUR** Adults usually in pairs, and immatures often solitary, but pairs may be only a few hundred metres apart at Rift Valley lakes (so that many adults visible at one time) and recently independent juveniles may gather in groups of around five (up to 50 or more at unusual food sources such as fisheries stations) and roost socially in concentrations of up to at least 30. At times of drought, even adults may congregate at drying pools: over 100 photographed together in Okavango, Botswana. Calling and duetting with head thrown right back (see Voice), whether perched or soaring, forms major part of display, but also included are undulating flights, spectacular aerial dives, and foot-touching or, occasionally, falling with talons interlocked. Calling also stimulates adjacent fish-eagles, and sometimes two or three pairs will display high in air together.

**BREEDING** Season variable and extended: around equator almost any month, but in southern Africa April–October, in coastal East June–December and in West October–April. Nest of sticks and papyrus, 120–150 cm across and 20–60 cm deep when new but after several years may become 200 cm by 150 cm, lined with heads of papyrus, reed or bulrush and sometimes weaver nests; usually as close as possible to water (occasionally several kilometres away) in tall acacia or other tree, rarely on rock stack or cliff-growing bush or ledge. Clutch 2 (1–4); occasionally 3 young reared. Incubation 42–45 days. Fledging 64–75 days, with dependence for c2 months.

**POPULATION** Densities often high for so large a raptor, e.g. 100 pairs in 120 km<sup>2</sup> on Ugandan rivers (where dense concentration leads to reduced breeding success, paralleling findings for Wahlberg's Eagle [229]); one

pair may need only 300–600 m of shoreline; but normally more scattered along forested rivers, e.g. 1 pair/10–20 km in Gabon. Population put at 100,000–200,000 adult pairs (Brown *et al.*) plus unknown numbers of immatures. Although it might be thought to compete with humans for fish, not usually persecuted, nor particularly threatened by habitat changes. Numbers probably fairly stable, but in some regions increasingly at risk from water pollution, notably build-up of organochlorine pesticides in fish: eggshell-thinning recorded in South Africa (cf. Peregrine Falcon [309]). It has been calculated that around 95% of young fail to survive to adulthood, indicating that adults must live 16–24 years to maintain population.

**GEOGRAPHICAL VARIATION** Monotypic, though southern birds average larger than northern. Forms a superspecies with Madagascar Fish-eagle [45].

**MEASUREMENTS** ♂ wing 487–543 mm, ♀ 528–571 mm; ♂ tail 190–222 mm, ♀ 208–238 mm; ♂ tarsus 80–94 mm, ♀ 88–99 mm. **Weights** ♂ 2.0–2.5 kg (three), ♀ 3.2–3.6 kg (two).

**REFERENCES** Benson & Benson (1975), Brosset & Erard (1986), Brown (1980), Brown & Cade (1972), Brown & Hoperaft (1973), Brown *et al.* (1982), Cramp & Simmons (1980), Culverwell (1985), Davies & Randall (1989), Douthwaite (1992), Geldenhuys (1984), Gunn *et al.* (1989), Gore (1990), Grimes (1987), Hines & Raab (1989), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957–75), Maclean (1993), Morgan (1979), Pakenham (1979), Pickford *et al.* (1989), Pinto (1983), Prout-Jones & Milstein (1986), Shirihai (1996), Smart (1991), Steyn (1960, 1972, 1982), Sumba (1986, 1988, 1989), Sumba & Pomeroy (1984), Tarboton *et al.* (1989), Thiollay (1981), Thiollay & Meyer (1978), Thomson (1984), Whitfield & Blaber (1978).

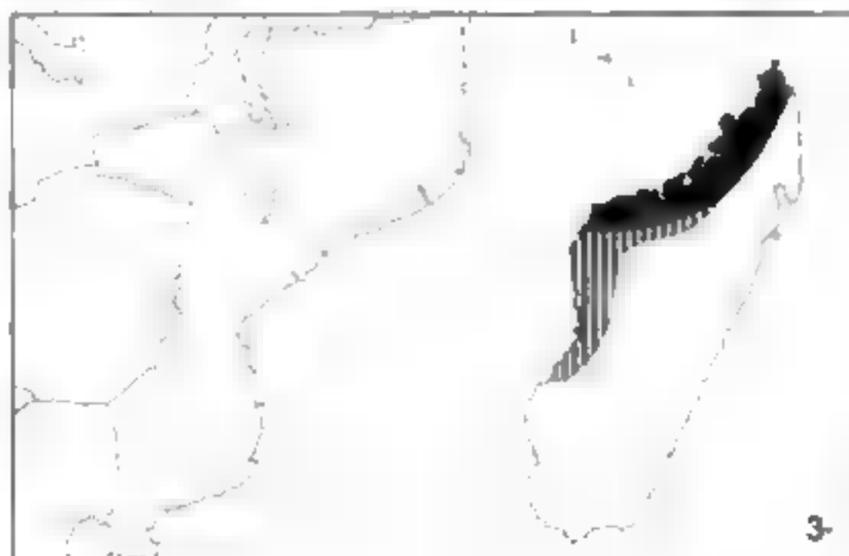
## 45 MADAGASCAR FISH-EAGLE

*Haliaeetus vociferoides* Des Murs, 1845

Plate 16

Other name: Madagascar Sea-eagle

**DISTRIBUTION** Malagasy (12°S to 21°S, but chiefly 15°S to 20°S); order 3; seriously decreased and rare. Endemic to Madagascar, where formerly locally common (late in 19th century was 'all along the western coast and on the numerous small islands of the north-west of the mainland'), but greatly reduced in northwest and now down to 'critical' level of under 100 breeding pairs,



mainly along west side between Mahajamba Bay and the Tsiribihina River; often stated to have been present along east coast as well, but this apparently based on repetition of unsubstantiated record, and evidence for southern coast probably also weak; not recorded in southwest since 1975.

**MOVEMENTS** Adults sedentary, but immatures seem to be strongly dispersive and wander up to 200 km south and, to lesser extent, north. Apparently also two old records (not aged) from Mauritius.

**HABITAT** Largely coastal, especially rocky islands and coastal cliffs, mangrove swamps with tall trees and wide channels and wooded estuaries and mangrove-bordered bays, where shallows provide good feeding, but also larger rivers and lakes, especially adjacent to wooded areas, up to 90 km inland (particularly along the broad reaches of the lower Tsiribihina River); roosts in tall trees near water. Thus, typically at or near sea-level, but odd pairs and wandering immatures up to 1,200 m.

**FIELD CHARACTERS** Small fish-eagle, slightly smaller and relatively shorter-winged, longer-tailed and longer-

legged than African counterpart [44], but biggest raptor in Madagascar, brown, whitish and rufous as adult, with stocky build and rather small head. Spends much of day almost motionless on conspicuous perch on tree, post, rock or sandbar, but may retreat to shaded sites during hottest times; wings reach tail-tip, but fall short on longer-tailed juvenile. Sexes similar, but female 4–9% larger; juvenile quite distinct; intermediate immature stages over about five years.

**PERCHED Adult** Mainly dark brown, edged rufous on mantle and wing-coverts, and heavily streaked rufous on lower neck and breast, with contrasting pale head and tail: grey-white crown and nape streaked rufous and brown, more or less plain whitish cheeks and throat, and white tail with blackish shafts. **Juvenile** Lighter brown, edged whitish above and streaked yellow-buff to whitish below, with streaked tawny head, pale greyish cheeks, and whitish-edged grey-brown tail. **Immature (first- to fifth-year)** Series of partly overlapping annual moults produce rather variable intermediate stages: head becomes paler with whitish cheeks, chest also lighter brown before darkening; broad whitish edges to inner secondaries decrease and disappear; tail becomes smudgy whitish-grey, then clearer white. **Bare parts** Eyes brown. Cere and legs whitish, somewhat greyer in early immature stages.

**FLIGHT** Large raptor with broad rectangular wings that have somewhat rounded tips and usually well spread fingers, and shortish rounded tail, typical of *Haliaeetus*, but head relatively small; wingspan 2.7 times total length. Slow laboured beats while rising, but, like other fish-eagles, then soars majestically and glides on flat or fractionally raised wings. **Adult** All dark (streaked rufous on neck, breast and wing-linings) but for pale head, white tail and whitish primary bases below. **Juvenile/immature** Lighter brown and more streaked with only slightly paler head, including streaky crown and clearer cheeks, and grey-brown tail becoming greyer and then whiter; whitish streaks on wing-linings and broad whitish edges to inner secondaries.

**CONFUSION SPECIES** None, simply on size, bulk and flight shape alone. Next largest raptors, Madagascar Gymnogone [90] and very rare Madagascar Serpent-eagle [88], both quite different in appearance, while Madagascar Buzzard [205] is a typical small buteo.

**VOICE** Very noisy, with loud, shrill and rather gull-like *ka ko koy-koy-koy-koy*, somewhat reminiscent of African Fish-eagle [44] and similarly uttered with head thrown back. Generally from perch, however, and apparently rarely in flight.

**FOOD** Chiefly surface fish, some taken from fish-traps or when stranded in shallows; also crabs, occasionally carrion. Unsuccessful attacks recorded on African Spoonbill *Platalea alba* and Malagasy Heron *Ardea humbloti*, but these are the only suggestions of piracy or of attempting to prey on warm-blooded animals [cf. 44]. Mainly still-hunts, plunge-diving into water after short flight from perch; sometimes drops on to prey during exploratory circuits over water, more rarely while soaring.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, more usually, in pairs. Soars high over territory. Displays probably

both vocal and aerial, involving repeated calling and some soaring and diving like African Fish-eagle [44].

**BREEDING** June–December. Substantial nest of branches and sticks, perhaps 120 cm across, lined with sprays of leaves, high in mangrove or waterside forest tree or on island cliff; one was on cliff only 6–8 m high. Clutch probably usually 2. Incubation c41 days. Fledging c120 days.

**POPULATION** One of the world's eight rarest raptors and classed as 'critically endangered': until relatively recently, fewer than 150 thought to remain, including some 50 breeding pairs, but more comprehensive surveys in 1990s showed that those numbers should probably be doubled. Still fairly common in 1930s, population was thought to be as low as 10 pairs in late 1970s, but increased field work raised this figure to 30 in early 1980s and to an estimated 40+ breeding pairs and 10 other adults at 48 occupied territories in 1985, the latter including mean inter-nest distances of as little as 1.48 km in some areas. Then, extensive surveys during 1991–95 found at least 222 adults at 105 sites, including an estimated 99 breeding pairs, plus unassessed numbers of immatures. These figures do not, however, represent real growth in a population which is spread along 600 km of coasts, rocky islands, and lake and river shorelines. Rather the species is still regarded as 'probably declining rapidly'. It is also concentrated in three main areas. Long-term decline and current rarity are due to hunting, trapping and nest-robbing combined with destruction of waterside forest and now development of wetlands as rice paddies; these all remain major problems, and continued deforestation coupled with poor agricultural practices causes soil erosion, leading to impoverishment of aquatic foraging habitat. In the Antsalova region, where up to half of this fish-eagle's population breeds, a project is under way involving the local Sakalava people, whose knowledge and traditional use of the wetlands is being used to select special reserves, integrating conservation with sustainable development.

**GEOGRAPHICAL VARIATION** Monotypic. Forms a superspecies with African Fish-eagle [44].

**MEASUREMENTS** ♂ wing 484–494 mm, ♀ 514–529 mm; ♂ tail 229–273 mm, ♀ 269–295 mm; ♂ tarsus 92–100 mm, ♀ 99–106 mm. **Weights** No data.

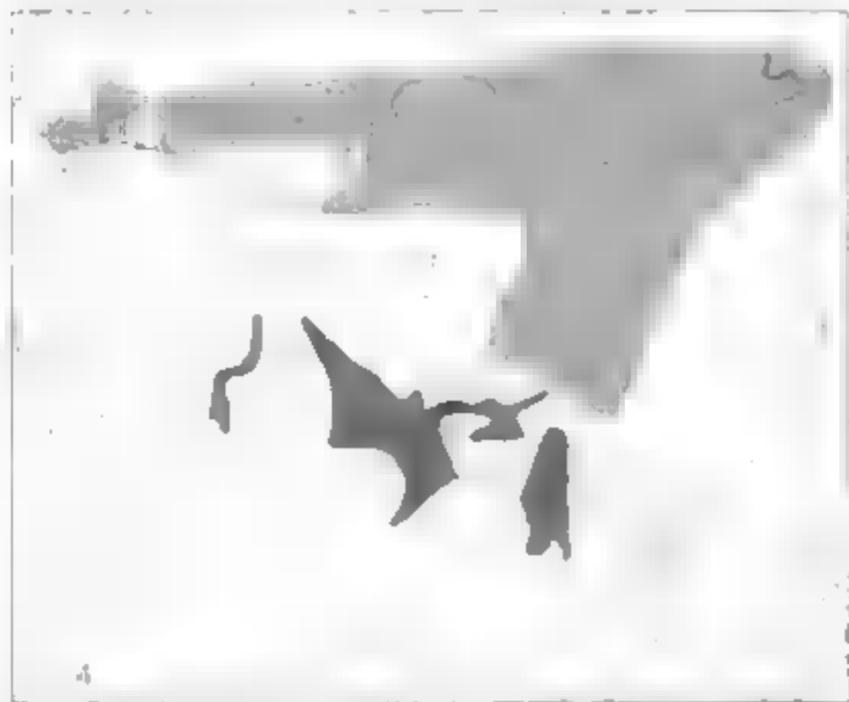
**REFERENCES** Berkelman *et al.* (1999a/b), BirdLife International (2000), Collar & Andrew (1988), Collar & Stuart (1985), Collar *et al.* (1994), Dee (1986), Delacour (1932), Ferguson-Lees & Faull (1992), Langrand (1987, 1990), Langrand & Meyburg (1984, 1989), Meyburg (1979a), Milon *et al.* (1975), Morris & Hawkins (1998), Peregrine Fund (1998), Rabarison *et al.* (1997), Sibree (1891), Thiollay & Meyburg (1981), Thomsen (1994), Watson (1988), Watson *et al.* (1995).

**46 PALLAS'S FISH-EAGLE**  
*Haliaeetus leucoryphus* (Pallas, 1771)

Plate 17

Other names: Ring-tailed or Band-tailed Fishing-eagle

**DISTRIBUTION** Palearctic and Indomalayan (c52°N to 16°N); order 4; widely but apparently thinly distributed and, though status unknown in some regions, has declined or disappeared in many others, and is now vulnerable. Central and south Asia: precise distribution poorly known, but breeds from Kazakhstan (very rare, perhaps extinct), Uzbekistan and Tajikistan eastward through Mongolia to north China, south discontinuously to Pakistan (mainly along Indus system, rare), northern India (Kashmir across to northeast, south to northern Madhya Pradesh and southeast Orissa), Nepal (winter visitor, may breed), Bhutan, Bangladesh, Burma and south-central China (Sichuan); formerly also west to area north of Caspian Sea (last bred 1947, no longer regularly summers in Volga-Ural steppes) and used to straggle to Ukraine, Crimea and eastern Caucasus.



**MOVEMENTS** Poorly known, but northern birds migratory, few remaining where waters freeze. Dispersal from northern breeding grounds begins October, and first breeders return by March. Moves south into Iran and Afghanistan, and clearly also into north Indian subcontinent, but presence in latter of more sedentary breeders renders situation there difficult to evaluate; formerly wintered in Iraq but no recent information, and may no longer do so. In India, moves after breeding (i.e. after May or June) from hot lowlands to higher areas, what are presumably non-breeders present on plateau lakes of western Tibet in June-July assumed to come from the subcontinent. Vagrants recorded west to Middle East and formerly (pre-1950), if very rarely, to Europe (one immature record each in Norway, Finland, Poland; adult seen in Germany, Denmark, Netherlands in September-October 1976 likely to have been an escape), also south to southeast Asia.

**HABITAT** Virtually confined to freshwater habitats, from inland seas, large and small lakes, and ponds, to rivers and other watercourses, in fact wetlands of all kinds, even small; rarely coastal, though sometimes by tidal creeks. Often in arid areas such as steppes and, in parts of range, commonly encountered near human habitation, especially fishing villages, where partly

commensal with people and often a tame, bold scavenger; will at times nest in large trees in villages. Occurs from lowlands to high plateaux, mostly at lower levels but locally to 4,000 m, and in Tibet to 5,200 m.

**FIELD CHARACTERS** Longish but relatively lightweight fish-eagle, as adult mainly dark, paler below, with conspicuously pale head and broadly black-ended white tail, juvenile paler overall and lacking white, with longish neck, slim head, stout but comparatively small bill, and medium-length tail. Rather sluggish, given to spending long periods immobile on tree, rock or other vantage point, when adopts somewhat more horizontal stance than other fish-eagles; wing-tips short of tail-tip. Sexes similar, but female generally larger (by up to 19%) and averaging 9% heavier; juvenile distinct; much as adult by five to six years, but may breed in fourth year.

**PERCHED Adult** Head dull cinnamon-pink (pale ochrous when worn), crown often tinged brown, grading into yellow-brown neck and mantle and, below, to rufous-brown underparts with browner flanks; in contrast, upperparts basically dark warm brown, darkest on shoulders, with flight-feathers very dark, primaries almost black; tail appears white with broad dark tip, its dark base concealed at rest (see 'Flight'). **Juvenile** Rather like immature White-tailed Fish-eagle (48), though less heavily built and smaller-billed; dark brown sides of face and ear-coverts form diagnostic dark mask; also paler grey-brown above, with diffuse pale brown or buff edges to mantle, scapulars and upperwing-coverts; tail all dark, with pale upper tail-coverts; underparts rufous-tinged grey-brown and only faintly, if at all, streaked. **Immature** Similar to juvenile, but soon showing pale crown and hindneck, when facial mask even more obvious, and paler underparts; with gradual progression towards adult plumage, throat becomes even paler, usually shows mixture of old and new feathers, and slight white mottling soon visible on central part of tail, later developing into white band with blackish mottling. As adult after five to six years. **Bare parts** Adult eyes dark brown or dark grey, occasionally yellow (presumed old birds), juvenile brown. Adult cere pale grey-blue, sometimes yellowish, bill dark greyish-blue with darker tip; juvenile cere and bill grey. Adult legs whitish to dirty yellow, juvenile off-white.

**FLIGHT** Fairly large, relatively slim raptor with smallish head on quite prominent neck, long and rather broad wings almost parallel-edged and pinched in at bases, and (for a fish-eagle) fairly long round-ended tail (juvenile silhouette different: slightly broader wings, especially arms, and somewhat longer though still rounded tail); wingspan 2.6 times total length. Light, easy wing action, often with relatively fast beats, and impressively agile and manoeuvrable in pursuit of other birds; glides and soars on level wings, held straight out from body in soar. **Adult** Distinctive: pale head and neck, extending into V-shape on mantle, contrast with dark brown of rest of upperparts, including wings with grey-based primaries, and conspicuously white tail with very broad blackish terminal band; below, very pale head and neck merge into rufous underparts, becoming darker

on flanks, thighs and crissum, while dark wings show hint of paler, greyer diagonals; undertail with striking broad white central band. **Juvenile** Above, brown with paler edges, and darker plain flight-feathers and tail; dark facial mask evident if seen reasonably well; from below, rufous-brownish body with somewhat paler chest, darker tail, and very distinctive underwing pattern of dark-mottled linings and plain dark brown remiges but whitish axillaries, conspicuous broad pale mid-wing diagonal, and well-demarcated large white primary-windows against dark carpal arcs. **Immature** Gradually develops pale head and neck and loses pale primary patches; underwing-band, too, decreases with age, while indistinct white mottling on middle tail of juvenile progressively becomes more obvious white band with blackish mottling; many immatures have mixture of old and new feathers, then secondaries often ragged-looking with newer, shorter feathers against older, longer ones. Even in fourth year, subadults often show relatively paler panel in centres of upperwings and, below, distinctly pale throat against somewhat darker head.

**CONFUSION SPECIES** Combination of very dark upperparts and wings, more rufous underparts, pale pinkish-white or ochre head and conspicuous white-banded tail makes confusion of adult with any other large raptor unlikely. Main possibility, though slight, is Grey-headed Fishing-eagle [51] (much smaller, shorter and broader wings, grey foreparts, white belly). Juvenile and younger immatures might conceivably be confused with young White-tailed Fish-eagle [48] but are always smaller and slighter than that species, with narrower wings, and longer tail that never has the whitish inner webs of rectrices often visible on juvenile White-tailed; further distinctions include noticeably slimmer neck and head and slighter bill, while underwing much more boldly marked with obvious pale central band and diagnostic pale primary-patch, still discernible on older immatures. At any age, shape, proportions, flight action and underwing pattern should rule out all *Aquila* eagles: though amount of white in tail of adult Pallas's can be matched by young Golden Eagle [224], that species shows sufficient additional differences not to cause problems (obvious whitish primary-flash above as well as below, much darker head even at distance, wings slightly raised and slightly forwards in soar, usually different habitat).

**VOICE** Vocal in breeding season, much less so at other times. Best known call is far-carrying, yelping *kyoo-kyoo-kyoo*... reminiscent of 'hoarse Pekinese barking' or 'very like the creaking of the unoiled wooden block tackle of a village well' (Ali & Ripley). Other described calls include an often trisyllabic barking *kok kok kok*, rather like large gull; a low croaking; a chicken-like but rhythmic clucking; and a neighbouring sound suggestive of Black Kite [39].

**FOOD** Predominantly fish; also birds, some mammals (rodents, lagomorphs), frogs and reptiles (snakes, terrapins); commonly carrion. Catches fish from near surface, without plunging, but probably takes more as carrion or as discards around fishing villages; scavenges and feeds on carrion of all kinds, even human corpses. Live bird prey mainly aquatic species, and not necessarily sick or injured. In winter in India subsists largely on immigrant Common Coots *Fulica atra*, 'making constant

raids on the swimming herds and scattering them...to isolate one individual and stoop on it repeatedly as it surfaces for breath until it is exhausted and can be seized...Occasionally both birds of a pair will take turns in this process...I has been observed to sit on a struggling victim in shallow water for some minutes in a seemingly deliberate attempt to drown it' (Ali & Ripley). Sometimes kills even birds as large as Demoiselle Crane *Anthropoides virgo*. Also accomplished nest-raider, taking appreciable numbers of nestlings at breeding colonies of Oriental White Ibis *Threskiornis melanocephalus*, Asian Openbill Storks *Anastomus oscitans* and Indian Darters *Anhinga melanogaster*, as well as young of terns, geese and other ground-nesting waterbirds. Agile pirate, too, and will attempt to chase and rob, particularly, Ospreys [8], Northern Marsh Harriers [100] and, in India, Brahminy Kites [41], as well as gulls and crows.

**SOCIOSEXUAL BEHAVIOUR** Solitary when breeding, but small numbers may occur more or less together around favoured feeding places; more sociable in winter, again especially at good food sources; also migrates in small parties, as well as singly. Displays poorly described, but with much aerial content such as mutual soaring, and apparently highly vocal; probably similar to congeners (e.g. White-tailed Fish-eagle [48]).

**BREEDING** Season varies with latitude: October–June (mostly November–May) in south of range, late March–July in north, and as late as May–September in Transbaikalia and Tibet. Very large nest of sticks and branches, with repeated use up to 2 m across and over 1 m deep, lined with fresh greenery, often 15–35 m up in large tree (even inside villages in some areas) or, especially in north, on crag, sometimes on ground or in reedbed, and usually at least fairly close to water. Clutch 2–3 (2–4). Incubation presumed c40 days (reports of 30–32 seem improbable). Fledging at least 70 days, rarely (and presumably in south only) up to 105; independence at around 30 days.

**POPULATION** Now classed as vulnerable, this species has been seriously affected, and is constantly further threatened, by the drainage of essential wetlands, the felling of large waterside trees (used for perching and nesting), environmental pollution from pesticides and industrial effluents, and, especially in India, the silting up of lakes through run-off following deforestation, and the choking spread of water hyacinth *Eichhornia crassipes*, in some countries other human pressures, such as overfishing, constant disturbance and even shooting are additional factors, and in Burma the development of oil and gas fields is considered a further threat (BirdLife International). Very little information on numbers in any part of range, which still extends over more than 1 million km<sup>2</sup>, but the species appears to be very sparsely scattered throughout. Formerly more common, and in some places pairs then nested within c1 km of one another, and may perhaps still do so very locally if conditions particularly favourable. But general decline and range contraction since first half of 20th century led to species's disappearance from region stretching from Crimea, Ukraine and Caucasus across to northwest Kazakhstan. No numerical data on eastern populations, but nothing to indicate that those in China, Mongolia and Burma are anything but scarce at best. Fewer than

40 pairs in Pakistan in 1974, and this figure unlikely to have increased since then; elsewhere in Indian subcontinent, where was once locally common in north India and Bangladesh, has declined in recent decades, and now considered scarce to rare, though perhaps slightly less so locally (e.g. Bhutan). The total population is put by BirdLife International in the range 2,500–10,000 mature individuals, but it may well be nearer the lower end: the upper figure would involve an average of 1 pair/200 km<sup>2</sup> over the whole present distribution, which, on current knowledge, seems unlikely.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 545–585 mm, ♀ 558–624; ♂♀ tail 251–298 mm, tarsus 95–108 mm. **Weights** ♂ 2.0–3.3 kg, ♀ 2.1–3.7 kg.

**REFERENCES** Ali & Ripley (1978), Beaman & Madge (1998), BirdLife International (2000), Borodin (1984), Cheng Tso-hsin (1987), Collar & Andrew (1988), Collar *et al.* (1994), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Dementiev *et al.* (1966), Etchécopar & Hür (1978), Flint *et al.* (1984), Gænsbøl (1986, 1995), Grimmett *et al.* (1998), Inskipp & Collins (1993), Inskipp & Inskipp (1985), Knyshantsev (1993), Lewington *et al.* (1991), Mauersberger *et al.* (1982), Meyer de Schauensee (1984), Roberts (1991), Sarker & Iqbal (1985), Smythies (1986), Vaurie (1965).

## 47 BALD EAGLE *Haliaeetus leucocephalus* Linnaeus, 1766

Plate 17

Other names: White-headed Eagle, White-headed Sea Eagle, American Eagle

Preferred names: Bald or White-headed Fish-eagle

**DISTRIBUTION** Neartic (68°N to 23°N, winter 62°N to 23°N); order 6; widespread, in places common and even abundant (e.g. southeast Alaska), but in many areas local and scarce, and rare in extreme southern range. North America and, marginally, Central America: breeds Aleutian Islands, Alaska (except north and west) and eastward through Canada (north in west to Great Bear Lake, turning southeast to run below Hudson Bay) to Labrador and Newfoundland, extending south in USA to north California, west Wyoming and west Colorado in west, to south Saskatchewan and across to upper Mississippi river and Great Lakes and, east of there, to northern Pennsylvania and south on eastern seaboard to Chesapeake Bay; then, apart from isolated populations and scattered pairs in central Arizona, along Mississippi river and in coastal South Carolina, further small local breeding populations along Gulf coast of Texas and Louisiana, and in Florida (locally common); scattered pairs in many other states as results of reintroductions; in Mexico, rare resident in south Baja California and east Sonora.

**MOVEMENTS** Northern coastal populations resident, but inland Canadian and Alaskan breeding areas vacated

in September–October and reoccupied mainly from March. Migration primarily on broad front, though thousands recorded every autumn at Duluth in Minnesota (at western corner of Lake Superior); migrants winter chiefly on coasts but also widely inland through much of USA, with large concentrations in coastal Alaska (e.g. Chilkat river in southeast) and British Columbia, in Klamath basin in Oregon, and along the upper Mississippi, but much scatter in most areas and uncommon to rare winter visitor in northern Mexico (south to Nayarit, Durango, Coahuila and north Veracruz); movements of 2,200 km recorded; individuals observed north of breeding range, at arctic coasts, presumably wanderers from Alaska and Canada. In southern range adults probably largely sedentary, but many juveniles from California across to Florida disperse north and west in summer, while non-breeding immatures also more prone to wander. Vagrants recorded in Bermuda and west Europe (Ireland, Britain), and perhaps also on northeastern Asiatic coast.

**HABITAT** Breeds near water: coasts, estuaries, rivers, lakes, even large ponds, with preference for areas with large trees overlooking water to satisfy requirements for nesting and foraging lookouts; in north then found in tundra and conifer forest, and in south in cypress swamps and mangroves, in Mexico in even desert-like areas. Although frequently in similar habitats in winter, usually near water, then also occurs in waterless open country, such as sage-brush steppe and desert in western USA. Communal winter roosts usually in tall trees and in wind-protected valleys in colder areas (see Sociosexual Behaviour). Sea-level to 2,000 m.

**FIELD CHARACTERS** Large fish-eagle, as adult dark brown but for white head and tail, juvenile and younger immatures all dark or sometimes tail-base white, with heavy bill, comparatively small head and shortish neck, rather long wings and rounded tail, short legs with bare tarsi and strong feet. Perches openly and often conspicuously on tree, branch or cliff, or on ground, often several together (see Sociosexual Behaviour); wing-tips fall just short of tail-tip. Sexes alike in plumage, but female averages c9% larger and up to 28% heavier; juvenile and immature distinct; as adult after fifth moult, and first breeds then or, rarely, in preceding year.



**PERCHED Adult** Unmistakable: white head (sometimes with few dark spots) and white tail and tail-coverts contrast with dark brown body, wings and wing-coverts, the last thinly edged buff-brown when fresh. **Juvenile** Dark brown head (and dark bill); back and upperwing-coverts somewhat paler tawny-brown, feathers indistinctly darker-edged; uppertail dark brown with variable amount of whitish marbling, often as oval spot, or whitish with dark edges and wide terminal band, or entirely dark; below, dark brown breast usually contrasts with brown to tawny or (rarely) creamy belly, and sometimes some sparse whitish streaks visible; undertail usually whitish with dark edges and wide dark terminal band, but can be all dark. **Second/third-year** Dark head with wide pale eyebrows and darkish cheeks and throat; upperparts, including wing-coverts, dark brown with much whitish spotting, forming whitish triangle on back; dark brown breast contrasts with lightly to heavily dark-marked whitish belly; tail pattern variable as juvenile's (though shorter), but underside always whitish with dark edges and narrow dark terminal band. **Third/fourth-year** Similar to second/third-year, but with whitish cheeks that accentuate dark eye-lines. **Fourth/fifth-year** Transitional plumage much closer to adult: but whitish head usually with dark eye-stripes (very like Osprey [8]) and some dark spots/streaks, especially on nape, generally some white spotting on body and wing-coverts or even, occasionally, still white triangle on back; tail usually with black terminal band, but pattern highly variable, sometimes like that of younger birds. **Fifth/sixth-year** First adult plumage can have hint of dark eye-lines and black tips on some tail-feathers. **Bare parts** Adult eyes pale yellow, juvenile dark brown, turning medium to light brown in second/third-year, then whitish, until pale yellow in fourth/fifth year. Adult cere and bill yellow-orange, juvenile dark grey to blackish, second/third-year paler grey with yellow around nares, later dirty yellow, and by fourth/fifth-year yellow to yellow-orange. Adult legs and feet pale yellow, juvenile greyish.

**FLIGHT** Large, rather bulky raptor with fairly prominent head and neck protruding over half as much as round-tipped and relatively long tail (flatter about two-thirds wing width) and long and quite broad parallel-edged wings with six to seven deep-cut fingers (juvenile longer-tailed, longer-winged, clearly serrated trailing edges); wingspan 2.5 times total length. Powerful flight with slow, ponderous beats and only occasional brief glides; glides with wings flat and wrists pushed forward; soars with wings flat or slightly raised. **Adult** Highly distinctive: both above and below, white head and neck, tail and tail-coverts striking against otherwise dark plumage; some contrast below between blackish wing-coverts and greyer remiges, with hint of paler primary-base patches. **Juvenile** Mostly dark brown, with only small contrast above between tawny back and wing-coverts and dark head and flight-feathers, though uppertail often dark brown with variable amount of whitish or even mainly whitish with dark edges and broad dark terminal band; below, apart from contrast of tawny (rarely, pale creamy) belly with dark breast and dark-edged whitish tail-base, most obvious markings are white axillaries and white diagonals along dark-tipped median and greater wing-coverts and, usually, whitish base to dark-sided and broadly dark-ended tail (can be all dark). **Second/third-year** Differs from juvenile in white triangle on otherwise

uniformly dark upperparts and, below, variably dark-streaked white belly contrasting with dark breast (but some variation in pattern, and some immatures have all-white underwing-coverts); as wing moult incomplete, long retained juvenile secondaries contrast with shorter new, dark-tipped whitish ones and produce uneven trailing wing-edges. **Third/fourth-year** Like previous plumage except throat and cheeks whitish and secondary moult complete; trailing wing-edges now smoother (sometimes a single long juvenile secondary retained on one or both wings). **Fourth/fifth-year** Somewhat similar to adult, but with Osprey-like dark eye-stripes and some dark spots on head and tail, white spots on body and wing-coverts. **Fifth/sixth-year** If not now fully adult, differs only in some dark spotting on head and dark tips to some or all tail-feathers.

**CONFUSION SPECIES** Adult unmistakable within its range, where immatures distinguished from Golden Eagle [224] by unfeathered tarsi and, in flight, white axillaries, and head and neck extension over half that of tail (Golden less than half). In appropriate areas, vagrant juvenile or younger immature (second/third-year) would need to be distinguished from same-aged White-tailed Fish-eagle [48] (broader-winged, head more projecting, juvenile rusty upperwing-panel, dark-blotched paler underbody, darker linings, immature more wedge-tailed, mantle with whitish bases, often pale wing-bands above, pale-mottled underbody). Older immature/subadult with dark eye-stripes on pale head could possibly, if seen only very briefly, be mistaken for Osprey [8], but in anything but momentary glimpse that should be easily eliminated (e.g. noticeably smaller, very different shape, all-white underbody and wing-linings, barred flight- and tail-feathers below, black carpal patch, different hunting behaviour).

**VOICE** Most vocal when breeding, particularly during earlier stages of cycle; less so at other times. Voice weak, seemingly inadequate for bird's size (voices of hawks often substituted in some motion pictures). Calls from perch or in flight. Usual advertisement call rather fast series of velping notes, variously rendered as *kah-kah-kah*, *yo-ha-ha-ha* or *whee-he-he-he*, female lower-pitched.

**FOOD** Powerful predator, scavenger and carrion-eater. Preferred prey fish, both live and dead, but also takes birds and, to lesser extent, mammals, reptiles, invertebrates and carrion, as well as human refuse. Fish and birds (mainly waterfowl and seabirds) predominate in summer, though locally reptiles can make up fair percentage of prey by number. Mammals taken chiefly in winter, when carrion also important. Hunts mostly from exposed perch on upper branch of tree or on cliff overlooking water, from where, on sighting prey, makes long, gradual gliding descent to grab fish or waterbird on or near surface; less often hunts directly from air, after glide or circling flight; and sometimes goes for birds on the wing, knocking down and killing species up to size of goose. Also wades in streams or shallow rivers for fish, especially those migrating to spawning grounds. Regularly pirates prey from conspecifics and other raptors, especially Osprey [8].

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs when breeding, though nests sometimes in very loose small colonies; but at times on migration and in winter tens

or hundreds gather at abundant food sources; winter roosts of up to 1,000+ individuals regular in winter (thought to act as 'information centres' for location of food), and smaller ones also reported in summer along rivers near Chesapeake Bay. Aerial displays include undulating flight and mutual high-circling and soaring; cartwheeling apparently almost always involves territorial male expelling intruding male.

**BREEDING** April–August in Alaska and Canada, November–March (October–April) in south USA. Large stick nest, with repeated use up to 2.5 m across and 4 m deep, lined with seaweed, grass or other vegetation, usually in main fork but well below canopy of tree (often conifer) 10–60 m tall, or on broken-off tree top, less often on smaller bush, cliff ledge or ground. Clutch 2–3 (1, rarely 4). Incubation c35 days. Fledging 75–80 (75–92) days; dependence c1 month thereafter.

**POPULATION** Generally common but local to very local over much of North America, particularly in areas near water, though was once much more numerous. In first half of 20th century bounties were paid for this fish-eagle in Alaska, and probably some 150,000 were killed there during that period; whether species has yet recovered from such large-scale slaughter is debatable. In 1960s and 1970s it suffered further huge losses through adverse effects of pesticides, especially DDT, resulting in many local extinctions and widespread breeding failures; use of that chemical was banned in 1972, leading to generalised but locally variable recovery, numbers in some parts of western USA having increased four-fold by 1990s but elsewhere often remaining more or less depressed. In early 1990s, total population in winter (based on field counts) thought to be probably in range 110,000–120,000 individuals, over half of these in Alaska (40,000–50,000) and British Columbia (c30,000), with a good proportion in Saskatchewan (c12,000); and in rest of USA outside Alaska, estimated total of 4,000–5,000 breeding pairs (increased from c1,200 in 1980). With protection and reintroductions, numbers may have increased a little since then. Nevertheless, while this magnificent and symbolic raptor remains common in its northern range, and even locally abundant there, and despite its being locally common

in Florida during the breeding season, over much of its range and especially in the lower US states it is at best scarce; and southernmost populations are probably particularly threatened, the more so since they are for the most part broken up into widely scattered pairs. Future threats include further habitat loss and lead poisoning, along with general environmental pollution and perhaps, on a more localised level, disturbance or even persecution.

**GEOGRAPHICAL VARIATION** Two races normally accepted, differing only in size. Northern *washingtoniensis* considerably bigger than southern *leucocephalus*, but no constant plumage or other differences discernible and size variation clinal throughout; boundaries between the two therefore impossible to draw, and arguable whether species might not better be treated as monotypic. Individuals with dilute plumage, having reduced amount of melanin in dark feathers, are reported infrequently. Forms a superspecies with White-tailed Fish-eagle [48].

**MEASUREMENTS** Northern ♂ wing 570–612 mm, ♀ 605–685 mm; ♂ tail 290–322 mm, ♀ 300–365 mm. Southern ♂ wing 515–545 mm, ♀ 548–588 mm; ♂ tail 290–322 mm, ♀ 247–286 mm. Sexes of northern eagles separable by bill depth and hind talon (Bortolotti). **Weights** 2.5–6.3 kg (some overlap between sexes, but greater difference between northern and southern birds).

**REFERENCES** Anderson & Hickey (1972), Anthony *et al.* (1982), Bird (1983), Bohm (1988), Bortolotti (1984), Broley (1947), Brown (1988), Campbell *et al.* (1990), Chandler *et al.* (1994), Clark *et al.* (1989), Clark (1983), Clark & Wheeler (1983), Dugoni *et al.* (1986), Fielder (1982), Flath *et al.* (1991), Gerrard & Bortolotti (1988), Gerrard *et al.* (1992), Gerrard *et al.* (1974), Grier (1982), Grubb *et al.* (1994), Hansen (1987), Hansen & Hodges (1985), Harmata & Stahlaker (1993), Harmata *et al.* (1985), Howell & Webb (1995), Hunt *et al.* (1992a/b), Johnsgard (1990), Kjos (1992), Leighton *et al.* (1979), Lincer *et al.* (1979), Madsen *et al.* (1982), McClelland *et al.* (1980), McCollough (1989), Palmer (1988), Platt (1976a), Ruchie (1982), Skerrod *et al.* (1975, 1976), Snow (1973a), Snyder & Wiley (1976), Sprunt *et al.* (1973), Stalmaster (1987), Steenhof (1983), Wheeler & Clark (1993), Todd *et al.* (1982), Wagner *et al.* (1988), Wiemeyer *et al.* (1984), Wood *et al.* (1993)

## 48 WHITE-TAILED FISH-EAGLE *Haliaeetus albicilla* (Linnaeus, 1758)

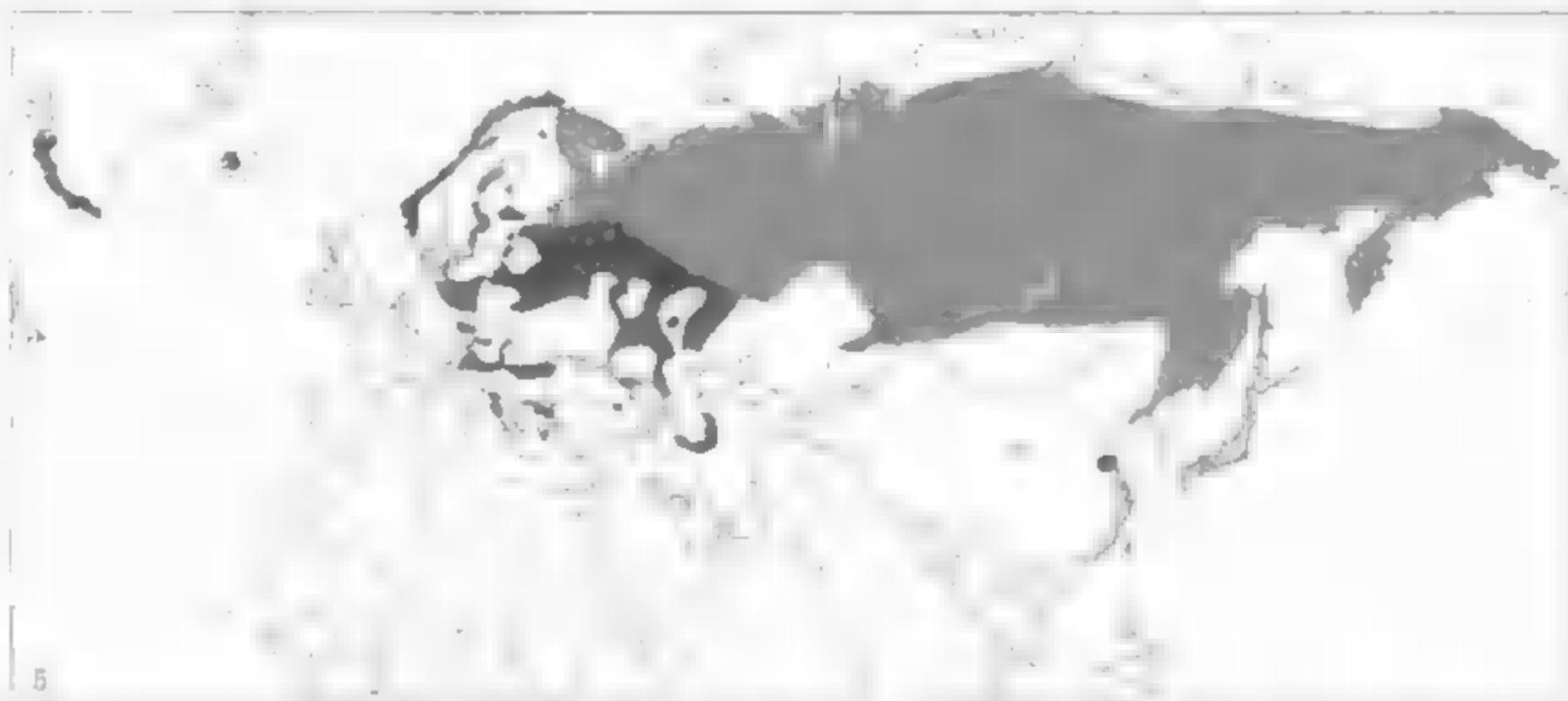
Plate 17

Other names: White-tailed Eagle, Sea Eagle, White-tailed Sea Eagle, Erne

**DISTRIBUTION** Palearctic, also marginally Nearctic and, in winter only, Indomalayan (72°N to 30°N, winter to c22°N); order 5; wide distribution and, though scarce to rare over many parts, and status uncertain in much of eastern range, locally not uncommon and even increasing. Greenland, north and east Europe, and mainly northern Asia; southwest Greenland only; in Europe, apart from isolated outposts in, for example, Czech Republic (Bohemia, reintroduced) and north of former Yugoslavia (mainly Croatia), confined to north and east from west Iceland, Scotland (reintroduced), coastal

Norway and other parts of Fenoscandia (north and southwest Finland, east Sweden) across Russia and into east Baltic countries, northeast Germany and Poland, as well as discontinuously southeast to Black Sea and Turkey; from European Russia extends eastward across north and central Asia (southern limits uncertain, at least to Caspian and Lake Balkhash) to Bering Sea, Kamchatka and Japan (north and east Hokkaido, rare), extending south on mainland to Manchuria (formerly to lower Yangtze); has bred Attu, in Aleutian Islands.

**MOVEMENTS** Resident and migratory. While ranging more widely outside breeding season, largely sedentary in much of western range, even far north in Greenland,



Iceland and Norway, though some of those, mainly juveniles, appear to move south in winter. Movements over much of Asiatic part of range are poorly known but most of northern and eastern populations appear to go south. Everywhere, juveniles and immatures not only more migratory and dispersive than adults but also both leave natal areas earlier and return northward later, mainly August–September and from about March–April respectively. In western range, winters south to France (regular in northeast) and northern Mediterranean region, less commonly but still regularly to Levant countries, and to Persian Gulf and, farther east, Indian subcontinent (mainly in north, and even there scarce to rare) and across to Japan and southeast China; in many areas irregular as a winter visitor (e.g. in Britain, where considered no more than a vagrant, though complicated by presence of reintroduced Scottish population). An interesting difference was found in eastern Asia between autumn and spring routes taken by birds wintering in Hokkaido: two adults captured in late December in southern Hokkaido were fitted with radio transmitters and then movements tracked by satellite: in February–March, both moved directly northward through Sakhalin and then along the Okhotsk coast to central or northern Kamchatka, where they remained from May until early-mid October; but they then took a different return route to the wintering area, moving south through Kamchatka and the Kuriles to reach Hokkaido again.

**HABITAT** Very varied, although usually closely associated with water, and generally in lowlands. At coast, frequents both rocky areas, including high cliffs, relatively low-lying islands and archipelagos, and, especially in winter, low coasts, estuaries and coastal marshes, and (e.g. Japan in winter) regions with intensive human fishing activity. Inland, requires secluded woods, forested areas or groups of trees, needing large trees for nesting, with access to freshwater wetlands such as lakes, river systems, marshes and extensive fenland; and, in some regions, readily visits commercial fish-farms, carp ponds and similar areas with easily accessible food.

**FIELD CHARACTERS** Very large fish-eagle, as adult mid brown with clearly paler-looking head, neck, breast and wing-coverts and white tail, juvenile and immature darker and more or less dark-tailed, all with ample bill

with relatively high culmen (adding to impression sometimes given of high, rather narrow crown, especially compared with *Aquila* eagles [see e.g. 224]), neck at times unexpectedly long-looking (sometimes creating surprisingly narrow-shouldered look for so big an eagle), short and slightly wedge-shaped tail, well-feathered tibia but bare tarvi. Typically, perches very upright on exposed branch, rock or other vantage point, or more horizontally on ground or other level surface; wing-tips reach tip of tail and may cloak it completely. Sexes similar, but female up to 15% larger and appreciably heavier (up to 25%) than male; juvenile and immature distinct; adult plumage acquired gradually over five to six years, and first breeding at that age, but tail not wholly white until about eighth year.

**PERCHED Adult** Essentially mid brown, but usually looks lighter owing to pale-edged leathers of upperparts and upperwing-coverts and scaly effect that these create: head, neck, breast and lesser coverts conspicuously paler, even pale yellowish-grey, grading to darker, more or less uniform rump, belly and thighs, with flight-feathers uniformly dark; against this, all-white tail can stand out, though often concealed by wings. In worn or bleached plumage light areas even paler, at times almost whitish (this sometimes thought to be particularly so with oldest adults, but dependent on degree of wear or bleaching of individual bird). **Juvenile** Much darker, richer brown or even blackish: apart from whitish lores and pale throat, head and nape dark brown, pointed hindneck-feathers with small pale tips; upperparts similar colour but variable according to extent of blackish-brown tips of otherwise buff-brown feathers of mantle, back and upperwing-coverts; tail, while appearing mostly dark, is in reality off-white with heavy black-brown mottling (especially on outer webs, which completely dark on outer rectrices) and dark tip; underparts buff-brown with dark streaks and spots, often with white feather-bases showing, especially on breast, but thighs more or less uniformly dark and undertail-coverts white with brown mottling and brown feather-tips. **Second-year** Somewhat paler-headed than juvenile, and differs further in whitish bases to upperbody-feathers contrasting strongly with dark brown tips, and some white often visible on median and greater upperwing-coverts; tail similar, but shorter. **Third-year / first subadult** Little

change from second-year until, in first subadult plumage, has inconspicuous whitish mottling on upperparts and belly; tail strongly mottled. **Fourth-year onwards** Largely without white except, variably, on tail and where any older or juvenile feathers retained. Pale head, neck and chest, and paler mantle, gained around eighth year, by which time tail fully white. **Bare parts** Adult eyes yellow, juvenile dark brown, immature brownish-yellow, becoming paler with age. Adult bill and cere pale yellow, juvenile dark blackish-brown; immature bill becomes paler horn-coloured, gradually becoming yellower from tip, not wholly yellow until fully mature, cere greyish. Adult legs and feet yellow, juvenile dirtier yellow, immature like adult but less bright yellow.

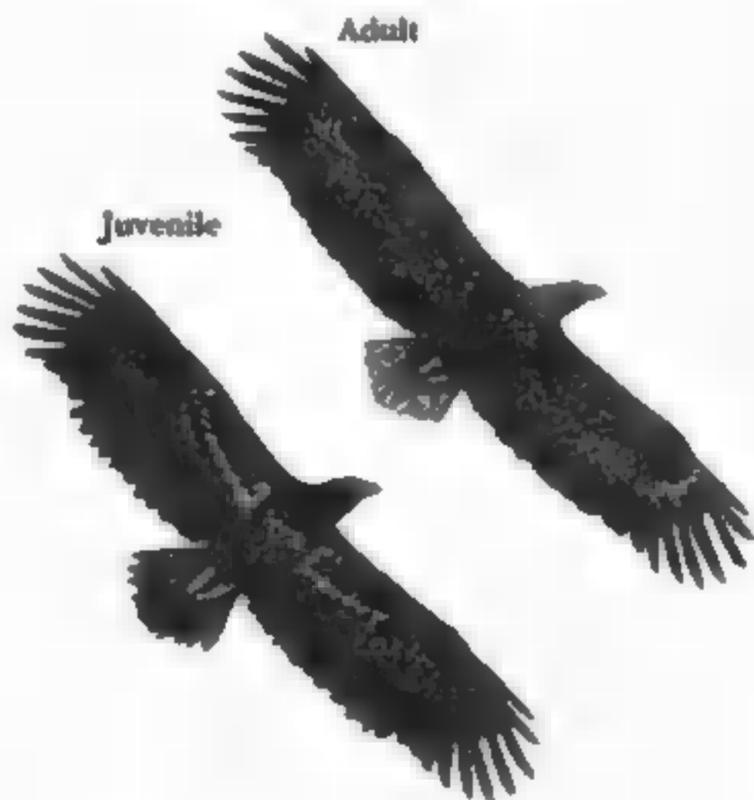


Fig. 28. Differing shapes of adult and juvenile White-tailed Fish-eagles *Haliaeetus albicilla* [48] are typical of the genus. Juveniles have longer tails and secondaries, and more pointed feather tips which produce serrated trailing edges.

**FLIGHT** Large, heavy-looking raptor, with prominent head and bill and short wedge-shaped tail protruding approximately equal distances and each roughly half to two-thirds wing width, and long broad wings virtually parallel-edged and very deeply fingered (usually at least six fingers visible), producing 'flying-door' shape of popular parlance (juvenile slightly longer-tailed with, though not always obviously so, slight curve or bulge to secondaries, latter pointed and producing distinct serrated rear wing-edges); wingspan 2.5 times total length. In level flight, which typified by occasional sudden rise or fall in flightpath, fairly shallow and, for size of bird, often quite fast beats interspersed with glides, or with little gliding at all, and at times, especially at distance, looking remarkably like huge brown heron; glides with wings flat or hand very slightly drooped; masterly soaring flight on flat or, when circling in thermal, perhaps very slightly raised wings held more or less at right-angles to body; like many very large raptors, can show unexpected agility, especially during aerial displays (see Sociosexual Behaviour) or in occasional dogfights with e.g. gulls or crows, when may even manoeuvre by closing or half-closing one wing. **Adult** Above, brownish and with strikingly paler, yellower-brown head and neck, as well as pale scalloping of some upperwing-coverts and

feathers of mantle and scapulars, contrasting with more uniform dark rump and all-dark flight-feathers; wedged tail white, sometimes with darker spots at base; from below, mainly brown with paler foreparts back to breast, shading to darker belly; flanks and crissum, sometimes with diffuse pale patch apparent around base of primaries, all contrasted by distinctive white, wedge-shaped tail, but in distant view of soaring bird, or one very high overhead, its translucence can render tail almost invisible. **Juvenile** Much darker, rich dark brown, with pale, rusty panel across upperwing-coverts, some whitish on mantle/back and innermost coverts and extending to secondaries, sometimes diffuse pale patch on primaries, but pale markings vary greatly in extent and conspicuousness, and some can be almost plain dark brown; tail looks dark blackish-brown with greyish-white feather-centres (in very close view, feathers off-white with black-brown mottling, tipped dark, outer webs of outer rectrices all dark); from below, body rather mottled brown and buffish with some pale streaking on breast, usually distinct whitish axillaries and variable (not always very obvious) pale bar across median coverts, marginally paler innermost secondaries, some whitish on tail. **Immature** Initially similar to juvenile but, from second year, head usually somewhat paler and, especially, shows whitish bases to mantle contrasting strongly with dark brown tips, and often some white on median and greater upperwing-coverts that can form quite distinct pale bands; by third, fourth year, inconspicuous whitish mottling on upperparts and belly, tail strongly mottled. Fourth-year onwards mostly dark except for some white on tail and variable amount of retained older, paler feathers. Pale head to chest, and paler mantle, acquired around eighth year, when tail now all white.

**CONFUSION SPECIES** Given reasonable view, adult unlikely to be mistaken: within range, only raptors of comparable size with all-white tail are adult Steller's Fish-eagle [49] and adult Bald Eagle [47], both of which are very different in other respects (former conspicuous white forewings; even in very poor light Bald should show sharp demarcation between white neck and blackish body, unlike gradual merging from pale to dark on White-tailed); at distance, conceivably confusable with Griffon Vulture [61] (even at long range dark tail and relatively tiny head should be apparent, distinctly curved trailing wing-edges, soars on raised wings). Juvenile and immatures require more care: in particular, these much less distinctly marked on underwing than similar-aged Pallas's Fish-eagle [46] (which also smaller, slighter, with longer, differently marked tail), Bald Eagle (shorter neck, longer tail, somewhat less broad wing) or Steller's Fish-eagle (very different wing shape, much more massive pale bill); Monk Vulture [63] superficially similar, but even larger and longer-winged, uniformly very dark, with conspicuous pale legs, and has relatively very small head. Over much of range, young White-tailed confusable with any *Aquila* eagle [see 218-222, 224], but distinctive shape (especially wings, relative length of tail, obvious projection of neck and head) will usually rule out most of those, as will absence of any clear pale primary-patch, above or below, and of clear-cut white or whitish uppertail-coverts, while all *Aquila* eagles lack pale axillary-patch often visible on immature White-tailed; some Greater Spotted Eagles [219] can superficially

resemble White-tailed in wing shape (but much smaller, never look quite so long-winged, never show such a protruding head); when legs seen, tarsi bare on White-tailed, legs fully trousered on *Aquila*.

**VOICE** Very vocal during courtship and early in breeding cycle, when duetting frequent; rather less so at other times. Calls in flight or from perch. Much variation, but main call fast series of short yelps or yaps, increasing in tempo and rising in pitch, usually 15–30 calls in sequence, female lower-pitched. Shriller and higher during perched displays (see Sociosexual Behaviour). Single or repeated *klee* or similar basic component of calls used in other circumstances, but very variable. Alarm call 3–4 short, loud *klee* or *klek* calls; sometimes deep gull-like bark when nest approached.

**FOOD** Powerful and versatile hunter and opportunist scavenger, carrion-eater and pirate, exploiting wide range of prey according to location and season. Diet includes fish, birds, eggs and nestlings and, though less commonly, mammals; in many areas, fish probably most important. Carrion may be particularly important in winter, or even throughout year in some areas such as Scotland, where lagomorphs also a major food; in latter area competes directly with Golden Eagle [224] for carrion, though this not apparent elsewhere (e.g. Norway). Live fish most commonly those found near surface, in either salt or fresh water. Avian prey include divers *Gavia*, grebes (Podicipedidae), ducks, coots *Fulica*, auks and gulls, and up to size of adult geese and swans. Mammals range from voles and lagomorphs up to size of sheep and deer calves, though most livestock recorded taken as carrion; almost no limit to size of carrion, which has even included human corpses. Fish grabbed in shallow feet-first dive from flight, occasionally plunging right into water, or similarly by dropping from low perch or vantage point; also fishes shallows by wading, or from shore or gravel islands. In some areas follows fishing boats; readily exploits commercial fisheries, stocked lakes, carp ponds and the like; scavenges dead fish or fish-offal in wide range of situations. Accomplished bird-catcher, especially of birds on water, relying more on surprise than on speed and agility; will repeatedly cause swimming bird to dive until exhausted, when easily caught, and pair may hunt co-operatively in doing this (or pursuing other prey); also seen to kill full-grown goose on water and tow it ashore, paddling with wings. Often raids nests of, especially, seabirds and eiders *Somateria*. Frequently pirates other birds, easily capable of robbing Ospreys [8] and other raptors, cormorants *Phalacrocorax*, gulls, and even otters *Lutra*.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, in home range, often in pairs, sometimes trios, more or less based around nesting site, and probably pairs for life; gregarious at winter roosts and favoured feeding spots, where gatherings in double figures not unusual and up to 100 recorded together. Impressive soaring, sky-dancing and other aerial displays, all with much loud calling, often performed by pair-members together, and including spectacular mutual cartwheeling downwards in which talons touch or interlock. Perched displays include sky-pointing and throwing head back, accompanied by high, shrill calls.

**BREEDING** Season varies with latitude, as early as January–June in south of range, April–mid September

in north. Huge nest of sticks and branches, averaging roughly 1 m across and up to 2 m deep though very old nests can be several metres in width and depth, lined variously with moss, greenery, seaweed or wool, up to 10–20+ m above ground in large tree or to 75 m up on cliff, rarely on ground, and generally at least fairly close to water; usually 2–3 sites used alternately. Clutch 2 (1–3). Incubation c38 days (34–46). Fledging 70–90 days; independence 30–40 days later.

**POPULATION** Formerly bred over much wider area, extending west to much of western Europe and south in that region to the Mediterranean. From 19th century, the species underwent a huge, well-documented decline with marked reduction in range, particularly in west and southwest, leading to extinction in, for example, Faeroes, Scotland, Ireland and most of Europe apart from north and east. During latter part of 20th century this trend partly reversed, or numbers stabilised, and by early 1990s populations actually increasing in Baltic countries and Fennoscandia, although still rare to scarce in eastern Mediterranean region and has not recolonised western end. Main reasons for earlier decline were human persecution, increased mortality caused by ingestion of poisoned baits and, particularly in 20th century, habitat destruction, pesticide usage and general environmental pollution. Recovery due chiefly to protection measures, including guarding of occupied eyries, and provision of safe food, aided partly by reintroductions in, for example, Bohemia in 1986 (c10 pairs in 1990s) and in Scotland (c15 pairs by late 1990s). Some increase in winter records noted in western Europe with recovery of northern populations, and over 500 recorded in winter in Japan, mostly in Hokkaido. Total world numbers unknown, largely because little accurate information from eastern parts of range except Japan, where probably no more than 20 pairs (all in Hokkaido); estimate for whole of former USSR as high as 5,000–7,000 pairs. Current information suggests up to c175 pairs in Greenland; and almost 3,500 pairs in Europe (including 35–40 Iceland), with most in Norway (1,500), European Russia (900–1,100), Poland (180–240), Germany (140–150) and Sweden (100–150), the most important southern population being 40–50 pairs in Croatia, while Turkey probably holds no more than 10–30 pairs. In prime habitat in north Europe, distance between breeding pairs found to be only 4 km (even as little as 1–2 km locally), and density at one Polish forest site of 6–7 pairs/km<sup>2</sup>; but such figures clearly cannot be applied to more than a small fraction of species' whole range, which at present covers perhaps 15 million km<sup>2</sup>, since within most of that area it is very sparsely scattered owing to its requirement for easy access to good fishing waters and the presence of suitable nesting sites. If one-tenth of the world range were occupied, a density of 1 pair/300 km<sup>2</sup> would produce a population of 5,000 pairs, which seems not unreasonable but quite possibly too low. The estimates above indicate a world total of 8,500–10,500 pairs, and true figure is considered likely to be somewhere near the lower end of that range. Like its congeners, this fish-eagle remains highly susceptible to persecution, disturbance and pollution, as well as to loss and degradation of habitat.

**GEOGRAPHICAL VARIATION** Monotypic. Although isolated Greenland population sometimes regarded as

separate race ('*groenlandicus*'), mainly because it is larger on average, the species varies clinally, increasing in size from southeast to northwest. Forms a superspecies with Bald Eagle [47].

**MEASUREMENTS** ♂ wing 552–640 mm (Greenland 624–652 mm), ♀ 621–715 mm (Greenland 660–717 mm); ♂♀ tail 254–331 mm, tarsus 92–101 mm. **Weights** ♂ 3.1–5.4 kg, ♀ 3.7–6.9 kg.

**REFERENCES** AOU (1987), Beaman & Madge (1998), Belk (1988, 1993), Bijleveld (1974), BOC (1971), Brazil (1991), Brazil & Hanawa (1991), Christensen (1979), Cramp & Simmons (1980), Dementiev *et al.* (1966), Etchécopar & Hür (1978), Fentzlöff & Minne Mann (1994), Fintha (1976),

Fischer (1984), Flint *et al.* (1984), Forsman (1999), Genschel (1986, 1995), Glutz von Blotzheim *et al.* (1971), Grimmett *et al.* (1998), Hagemeljer & Blair (1997), Halley (1998), Halley & Gjershaug (1998), Handrinos & Akriotis (1997), Helander (1990a/b), Helander & Gardelag (1989), Kampp & Wille (1990), Kavstamas (1993), Król (1983), Lowe (1983, 1988), Lowe & Ball (1979), Lowe *et al.* (1978), Meyer de Schauensee (1984), Mizera & Szymkiewicz (1991), Mori (1980), Newton (1979), Piechocki *et al.* (1981), Porter *et al.* (1981, 1996), Roberts (1991), Rogacheva (1992), Shirihai (1996), Sjernberg (1981), Sjernberg & Sautola (1987), Taimur & Randia (1984), Tucker & Heath (1994), Ueta *et al.* (1998), Watson *et al.* (1992), Wille (1979), Wille & Kamp (1983), Willgoos (1961, 1963, 1984).

## 49 STELLER'S FISH-EAGLE *Haliaeetus pelagicus* (Pallas, 1811)

Plate 17

Other names: Steller's Sea Eagle, White-shouldered Sea Eagle, Pacific Sea Eagle

**DISTRIBUTION** Palearctic (summer 62°N to 50°N, winter 58°N to 42°N); order 4; restricted breeding and wintering distributions, evidently declining, and considered vulnerable. Probably now breeds only in eastern Russia: from Koryakland coast of Bering Sea and coasts of Kamchatka, and northern Kuril Islands, around Sea of Okhotsk to lower Amurland and including Shantar and northern half of Sakhalin Island. Formerly bred Korea, and could possibly still do so in North where present status unknown, but likely extinct.



**MOVEMENTS** Resident where waters remain unfrozen throughout year, but Kamchatka and southern Kurils the main Russian wintering areas, though some also stay on western coasts of Sea of Okhotsk and on Sakhalin. Importantly, many winter in Japan, mostly in Hokkaido and there especially Shiretoko peninsula, where attracted to huge fishery at Rausu (see Food), with adults predominating until February but immatures by March; rare from Honshu southwards. Southward migration from northern breeding areas starts October, returning from March–April. A satellite-tracked juvenile remained in its natal area in Kamchatka almost two months after

fledging, but within three weeks had moved 1,360 km south, two-thirds of the way down through the Kurils to Urup, when the transmitter failed. Successful satellite-tracking of one captured on their Hokkaido wintering grounds showed that eight migrated north to northern Sakhalin and then to nearby Russian coasts, the other to Onecotan in north Kurils, adults reaching their destination much sooner (within 21–25 days) than young (31–61 days); one tracked bird returned in autumn by the same route (cf. White-tailed Fish-eagle [48]). Vagrant north to Anadyr, west to Yakutsk, south to Beijing and to Ryukyu Islands, and east to Pribilofs, Aleutian Islands, Unalaska and Kodiak Island and, much more unexpectedly, Kure Atoll and Midway at the extreme west of the Hawaiian group, over 3,000 km from the nearest regular range.

**HABITAT** Seldom seen far from water: typically, coasts, both low-lying and rocky, and large coastal lagoons and large lakes; in winter, also on and over sea-ice. In breeding season, requires combination of ready accessibility of fish and presence of tall trees or cliffs for nesting, often resulting in its occurrence around river mouths and on forested slopes and valleys along lower reaches of rivers, also far inland in more montane regions. Sea-level to at least 1,000 m.

**FIELD CHARACTERS** Huge, impressive fish-eagle, adult with very dark plumage strikingly relieved by white forewings and white wedge-shaped tail, juvenile streaky blackish-brown with whitish only on tail, both with massive, laterally compressed, almost 'cartoon-eagle' bill, shortish wings, long-looking wedge-tipped tail, and densely feathered tibia. Perches upright on exposed branches, rocks or other prominent vantage points, or, with more horizontal posture, stands on shore, stonebeds in rivers and other open areas; wing-tips fall well short of tail-tip. Sexes similar, but female averages 11% larger and 43% heavier and can be up to 19% larger and 79% heavier; juvenile distinct; immature progresses to complete adult plumage in about four years, when first breeds.

**PERCHED Adult** Apart from white forehead and, sometimes, some white on crown, whole head and almost entire body dark brown, many feathers with small pale tips, head and neck also with pale shaft-streaks, but

thighs, rump and uppertail- and undertail-coverts white; wings, too, blackish-brown except for contrastingly white lesser and median upperwing-coverts and alula, and tail completely white. (Korean form, probably extinct, all blackish except for white tail; see Geographical Variation.) **Juvenile** But for dark-tipped whitish tail, plumage all blackish-brown, streaked grevish on head and breast, with median coverts and innermost secondaries mottled whitish. **Immature/subadult** Plumage stages not well documented, but by third year neck and thighs show much whitish mottling, and whitish developing on lesser and median upperwing-coverts; tail whiter, but feathers still with variable dark tips. Subadult shows progressively more white on wings and tail-coverts and on tail. **Bare parts** Eyes yellow at all ages. Adult bare eye-ring orange-yellow, juvenile and immature pale yellow. Adult cere and bill rich orange-yellow, juvenile and immature pale yellow. Adult legs orange-yellow, juvenile and younger immature yellow.

**FLIGHT** Huge raptor with strikingly obvious massive pale bill on prominently protruding head and neck, distinctly paddle-shaped wings with bulging outer secondaries (even more pronounced on immatures and juveniles, latter also with distinctly pointed secondary tips forming serrated trailing edges to inner wings), and long wedge-shaped tail (less marked on juvenile) almost equal to breadth of pinched-in wing-bases; wingspan 2.2 times total length. Slow flight by powerful, rather shallow beats interspersed with short glides; soars on near-flat wings, fingers and tail spread. **Adult** From above, very dark but with striking contrast provided by broad white leading edges to wings, extending to lesser and median coverts, set against very black greater coverts, and white rump, uppertail-coverts and markedly wedge-tipped tail; similar pattern below, where white fore edges of wings and white thighs, crissum and tail stand out against otherwise blackish-looking plumage; huge orange-yellow bill obvious. **Juvenile** Blackish-brown above, but for whitish panel across median wing-coverts and extending to innermost secondaries, and whitish tail with dark tip; below, shows some pale mottling on chest and, especially, distinctive underwing pattern of dark-mottled whitish axillaries, whitish irregular band along whole wing-linings and whitish bases to all remiges, these reaching almost to rear edges of wings at innermost secondaries, while undertail whitish-grey with dark tips to feathers. **Immature** Plumage sequence poorly described, but by third year white leading edges to wings appearing and, on underwings, whitish band on wing-linings reduced in extent, axillaries still obviously mottled white, whitish panel on inner primaries, some pale mottling on innermost secondaries still visible; white mottling appearing on thighs; tail now much whiter, with reduced or irregular dark tips to feathers, and more markedly wedge-shaped. **Subadult** Not well described, but presumably increasingly resembling adult as body darkens and white areas become more prominent.

**CONFUSION SPECIES** At all ages, should be fairly readily identified by massive, deep, pale bill, and paddle-shaped wings with long outer secondaries producing pronounced bulge to trailing edges. Adult unmistakable: no other raptor combines huge size with diagnostic contrast of dark plumage and white forewing, thighs and tail; if Korean form 'nigr' still extant, that also

unique through size, shape, and combination of white tail with otherwise all-blackish plumage (see Geographical Variation). Juvenile and younger immatures, however, require closer attention: given reasonable view, confusion with any *Aquila* eagle showing superficially similar underwing markings unlikely, though immature Golden Eagle [224] with similar but less pronounced secondary bulge and dark-ended white or whitish tail a possibility (plumage much more contrastingly marked, broad blackish terminal tail-band rather than dark tips, white wing-flash generally much more conspicuous and differently shaped; see plate 79). Range, including winter, overlaps with that of White-tailed Fish-eagle [48] and, while confusion with much paler and differently marked adult of that species unlikely, problems could arise with juveniles and immatures. White-tailed then best distinguished by uniformly broad, almost parallel-edged wings (so-called 'flying-door' shape) or occasionally with some curve to secondaries (but nowhere near so pronounced as on Steller's), less obviously wedge-tipped tail and, though still relatively large, much less massive bill that remains dark until near adulthood, while below, apart from pale panel on underside of innermost secondaries obvious on some, underwing pattern of even well-marked White-tailed much less striking, and pale tail never has clear terminal band. Vagrant immature Steller's reaching Alaska needs to be distinguished from Bald Eagle [47], adult of which very different (wing shape more rectangular, tail less wedged, more rounded or squared, bill smaller, head and tail all white), but juvenile and immatures with dark-tipped pale tail and pale underwing markings more difficult (wing-shape, tail-shape and bill differences as for adult again important features, bill also darker, underwing-coverts more strikingly marked, older immatures with whitish belly liberally streaked darker).

**VOICE** Like other fish-eagles, probably most vocal in pre-laying period and during display. Loud, gull-like calls described during aerial display (see Sociosexual Behaviour); also a barking resembling that of White-tailed Fish-eagle [48], but louder and deeper. Gruff, barking *kyou-kyou-kyou* and strong *kra-kra-kra* heard at winter roosts and feeding areas as birds quarrel and indulge in aerial displays.

**FOOD** Powerful, versatile, opportunist scavenger, also a carrion-eater, but feeds principally on fish, especially salmonids, both alive and dead. Other foods very varied, mostly birds and mammals, but these become important only when preferred fish scarce. In main Japanese wintering area, principal food is Alaskan pollock *Theragra chalcogramma*, but there and elsewhere readily scavenges at seal carcasses, as well as those of, especially, wildfowl and gulls; some of these last also killed directly. Recorded once feeding on dead albatross *Diomedea*. Fishes by standing or wading in shallows, or from convenient sandbar, shoreline or low promontory, or by swooping into water from perch, which may be quite low or up to 30 m above surface; also from air, by circling at c6-7m and making shallow feet-first dive.

**SOCIOSEXUAL BEHAVIOUR** Solitary breeder, often seen in pairs in home range around nest site, probably pairing for life; but in winter quarters, including at favoured feeding areas and especially at roosts, more

social, with concentrations at Japan's Shiretoko peninsula, in Hokkaido, reaching over 2,000 at peak (i.e. around one-third or more of world population), and communal roosts sometimes numbering hundreds. Displays include single and, perhaps more frequently, mutual soaring over nest area, with much calling; and spectacular aerial chases and aerobatics, again accompanied by loud calling.

**BREEDING** Season varies according to climate, but chiefly late April–mid September. Huge structure of sticks and branches, up to 2.5 m across and (though usually much less) up to 4 m deep, in exposed position up to 30 m above ground on top of large tree or cliff ledge. Clutch 2 (1–3). Incubation 38–45 days. Fledging c70 days; usually only single young fledged, dependent on adults for further 2–3 months.

**POPULATION** Legally protected in both Russia and Japan (also in South Korea and China, where now only vagrant), but still declining, and currently classified as vulnerable. World summer population, all in eastern Russia, estimated at c2,200 breeding pairs in 1980s, and at 5,600 adults in total of 7,500 birds in early 1990s, including 1,200–1,500 pairs in Kamchatka. (If any still nest in North Korea, must be exceedingly rare there.) Winter surveys at that time indicated c4,000 in Kamchatka and c2,200 in Japan, 90% of the latter along Shiretoko peninsula, Hokkaido, giving corresponding winter estimate of 6,000–7,000. By 2000, however, BirdLife International quoted population of only c5,000 (spread in summer over 1.3 million km<sup>2</sup> but concentrated in winter into an area less than one-quarter of that size): this figure included only a 'few hundred' wintering in Kamchatka and along the coast of the Sea of Okhotsk and c2,000 in the southern Kuril Islands and Hokkaido. Continuing threats in Russia include large scale coastal developments for the petrochemical industry, inland hydroelectric power projects, logging for timber, and both industrial and pesticidal pollution of rivers. Human overfishing in Russia and Japan alike has also significantly reduced fish stocks and 'led to an increasing

tendency of birds on Hokkaido to move inland and scavenge on sika deer carcasses left by hunters, exposing them to a risk of lead poisoning through ingestion of lead shot'. Felling of stands of trees in traditional breeding areas has apparently led to some nests built in less suitable sites being prone to collapse. Shooting of the fish-eagles themselves may still be a local problem.

**GEOGRAPHICAL VARIATION** Monotypic. Some specimens from the Korean peninsula (and at least one from the adjacent south Russia's Ussuriland) were formerly believed to constitute a distinct race, or even species, suitably named 'niger' because adults differed in being all blackish apart from the white tail (thus lacking the white forehead, shoulders, rump, crissum and thighs). The number of these specimens is, however, very small and they are now generally considered simply to represent a dark morph of limited distribution. In any case, no authenticated record, either in the wild or in captivity, has been reported for well over half a century and it seems likely that this form is extinct (unless, just possibly, any remain in North Korea?).

**MEASUREMENTS** ♂ wing 570–590 mm, ♀ 610–620 mm; ♂♀ tail 320–345 mm, tarsus 95–100 mm. Weights ♂ 4.9–6.0 kg, ♀ 6.8–9.0 kg.

**REFERENCES** AOU (1987), Austin (1948), Babenko *et al.* (1988a/b), BirdLife International (2000), Bolau (1991), Brazil (1991), Brown (1976b), Chernikin (1965), Clark & Wheeler (1987), Collar *et al.* (1994), Dementiev & Gladkov (1951), Dementiev *et al.* (1966), Etchécopar & Hûe (1978), Fischer (1982), Flint *et al.* (1984), Fujimaki (1987), Gore & Won (1971), Inskipp & Collins (1995), Kivstautas (1993), Ladigin *et al.* (1991), Lavauden (1924), Lobkov (1978, 1985, 1991), Lobkov & Neufeldt (1986), Lobkov & Zueva (1983), Lobkov *et al.* (1988), Palmer (1988), Roberson (1980), Medvedev (1988), Meyburg & Lobkov (1994), Nakagawa & Fujimaki (1988), Nakagawa *et al.* (1987), Nechaev (1988), Rosliakov (1988), Shibaev (1987), Shibnev (1981), Shibnev & Trubkin (1988), Ueta *et al.* (2000), Vaurie (1965), Voronov (1988), Waliczky & Baldi (1991), Wheeler & Clark (1995), Wunderlich (1980), Zukowsky (1966).

## 50 LESSER FISHING-EAGLE

*Ichthyophaga humilis* (S Müller & Schlegel, 1841)

Plate 18

Other names: Lesser Fish-eagle, Himalayan Grey-headed Fishing-eagle

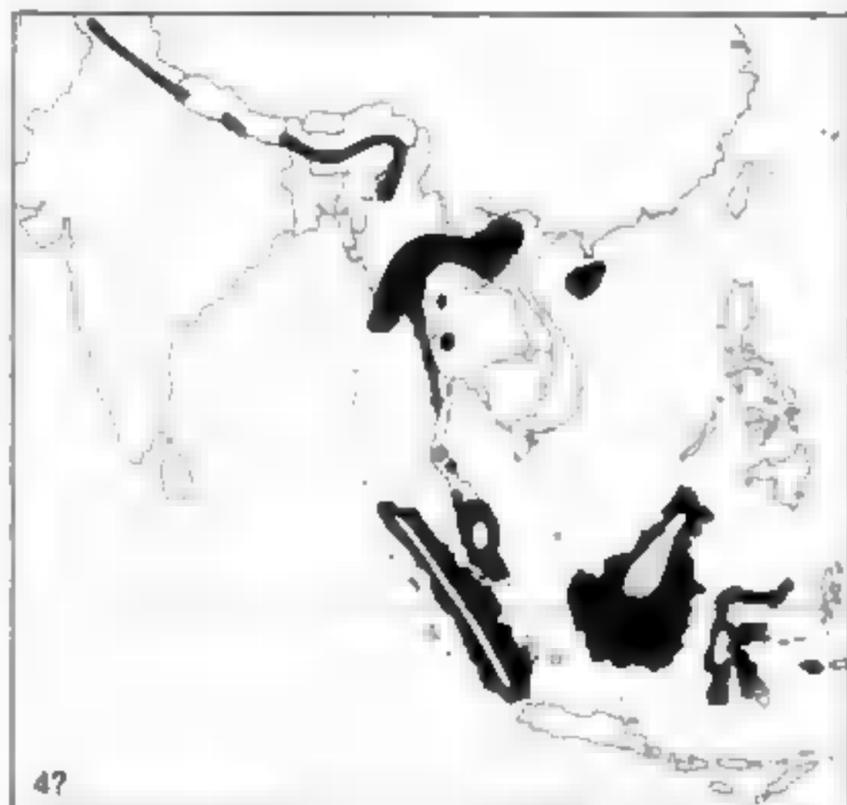
**DISTRIBUTION** Indomalayan (34°N to 6°S); order 4; extensive range but now only very locally at all common, and generally uncommon to rare. India and southeast Asia to Malaysia and parts of Indonesia: lower Himalayan slopes and foothills from Kashmir and Himachal Pradesh through Nepal and Bhutan to Assam, thence patchily through Burma and northwest Thailand to north Laos, north Vietnam (northwest Tonkin, south Annam) and southernmost China (Hainan); and from Tenasserim and peninsular Thailand and Malaysia to Sumatra, Natuna Besar, Borneo, Sulawesi (including Peleng, Buton and, in 1991, Taliabu) and, in southwest Moluccas, Buru (where only recently found).

**MOVEMENTS** Altitudinal movements in winter to

plains south of Himalayas from Punjab to Bihar. Otherwise, generally regarded as sedentary, but some more peripheral records (e.g. Taliabu, Buru) may relate to wanderers? In this connection, now described as 'rare visitor' to Hainan, but the distance and the sea-crossing that would be involved seem to make it more likely that there is a relict population there.

**HABITAT** Clear forested hill streams and fast-flowing rivers, to lesser extent also wooded lakes, irrigation tanks and swamps, rarely more open rivers and lakes. Mostly below 1,000 m from east Himalayas to Indonesia, but often from 1,000 m to 1,500 m farther west (and recorded to 2,500+ m and, in Nepal, even at 3,500 m and 4,250 m); locally down to sea-level in Indonesia.

**FIELD CHARACTERS** Small to smallish, huteo-sized fish-eagle, as adult grey-brown and white, with strong



bill, small head on longish neck, not especially long wings, short rounded tail, and shortish legs with unfeathered tarsi and long talons. Perches variously upright or hunched on low bare branches and mid-stream rocks; wing-tips reach half down tail. Sexes similar, but female usually larger; juvenile distinct enough; subsequent plumages unclear.

**PERCHED Adult** Head and neck brownish-grey to grey with black shaft-streaks; otherwise brown above with blacker primaries; sides of tail-base variably white-mottled, looking greyish, but centre brown and only slightly paler than rather indistinct subterminal band; breast brown, clearly demarcated from white belly, thighs and crissum. **Juvenile** Broadly similar in pattern when perched, including white lower underbody, but browner head and neck, lighter base to tail, and otherwise paler brown above with thin buff edges and some whitish bases showing through, and indistinctly streaked whitish on neck and breast. **Bare parts** Adult eyes yellow, juvenile brown, later mottled brown and yellow. Cere grey-brown to slate-grey. Legs dull white to bluish-white.

**FLIGHT** Medium-sized raptor with small but well projecting head, broad and (for fish-eagle) relatively short wings, and short rounded tail; central and outer secondaries longer than innermost secondaries and inner primaries, giving trailing wing-edges bulging S-shape somewhat pinched in at bases and wrists (juveniles have longer secondaries less pointed than *Haliaeetus*, so serrated trailing wing-edges not so obvious); wingspan 2.4 times total length. Powerful beats, or 'owl-like flaps' when gaining height to clear tall waterside trees; soars little, but apparently glides and soars on level wings.

**Adult** Looks rather uniformly dark grey-brown above but for slightly blacker primaries and subterminal tail; brown underside relieved by whitish bases to outer primaries and white abdomen and thighs; variably light-speckled tail-base shows some contrast above (sides only) and below, but never looks white. **Juvenile** Similar above, though paler and with slightly serrated wing-edges; much paler below with, in addition to white abdomen and thighs, white mottling on tail-base (looking whiter still because of long white coverts), on wing-linings (outlined in brown along primary and greater coverts), and on lightly dark-banded remiges (but contrastingly dark wing-tips); pale streaking on breast very inconspicuous.

**CONFUSION SPECIES** Habitat often different, but much of range coincides with that of similar but bulkier Grey-headed Fishing-eagle [51]: latter averages bigger but much overlap, especially with larger northern race of Lesser; adult best distinguished by clear white tail-base, well-defined black subterminal band, and evenly dark underwings (no primary-flashes); juvenile by paler head and breast (including buff supercilia and bold whitish streaks), brown-mottled thighs, brown-speckled bars on tail (no clear subterminal), and much more contrast between mottled wing-linings and dark-tipped but otherwise largely white flight-feathers; older immatures more like juvenile Lesser, but already have much sharper subterminal band by time white bases to primaries and outer secondaries are lost. See also Pallas's Fish-eagle [46].

**VOICE** Noisy at nest: 'succession of querulous shouts and cackles...In the distance this sounds distinctly plaintive and childlike, but at close quarters querulous and unpleasant' (Ali & Ripley). Calls *hak-hak*.

**FOOD** Only fish recorded. Still-hunts from regular waterside perches, usually bare branches or mid-stream rocks, dropping to snatch prey at or near surface. More rarely swoops down when flying along river.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Soars and calls over breeding area. No other aerial displays described.

**BREEDING** March–August in north India and Nepal, November–April in Burma. Large stick nest, 1 m or more across and deepening with repeated use from c30 cm to over 1.5 m, lined with green leaves, in tall forest tree by or near water. Clutch 2–5 (2–4). Incubation and fledging periods unknown.

**POPULATION** Distribution limits theoretically enclose over 2 million km<sup>2</sup>, and in optimum areas one pair may occupy 3–5 km of fast-flowing river, but species contracting in range and decreasing in numbers in India (Himalayan foothills and northeast only); rare and local in Nepal and Bhutan (both at lower altitudes); rare in Thailand (northwest and peninsular only); very local in Laos; rare in much of Vietnam (though 'locally fairly common' in west Tonkin and south Annam); declining and now scarce to 'fairly common' in peninsular Malaysia; uncommon in Sumatra and Borneo; and mostly uncommon to rare in Sulawesi (though 'locally common' in southeast). Was also described as 'locally common' in Burma in 1986, but that questionable now in light of extensive deforestation there. Tree clearance and consequent silting of streams, together with human overfishing and disturbance, blamed for declines in north of range and must pose continuing threats to population that is perhaps unlikely now to exceed four figures. Pesticide use is now another serious danger, at least in India's Uttar Pradesh.

**GEOGRAPHICAL VARIATION** Two races, differing only in size.

*I. h. humilis* (Tenasserim and peninsular Thailand southwards and eastwards) Smaller, apparently without overlap.

*I. h. plumbea* (Kashmir through north Burma and northwest Thailand to Hainan) Larger.

**MEASUREMENTS** *I. h. humilis* ♂♀ wing 394–397 mm, tail 174–205 mm, tarsus 66–73 mm. *I. h. plumbea* ♂♀ wing 426–495 mm, tail 215–248 mm, tarsus 78–91 mm. **Weights** 780–785 g (two, ♀ rare).

**REFERENCES** Ali & Ripley (1978), BirdLife International (2000), Bishop *et al.* (1994), Brown (1976b), Cheng Tsoshin

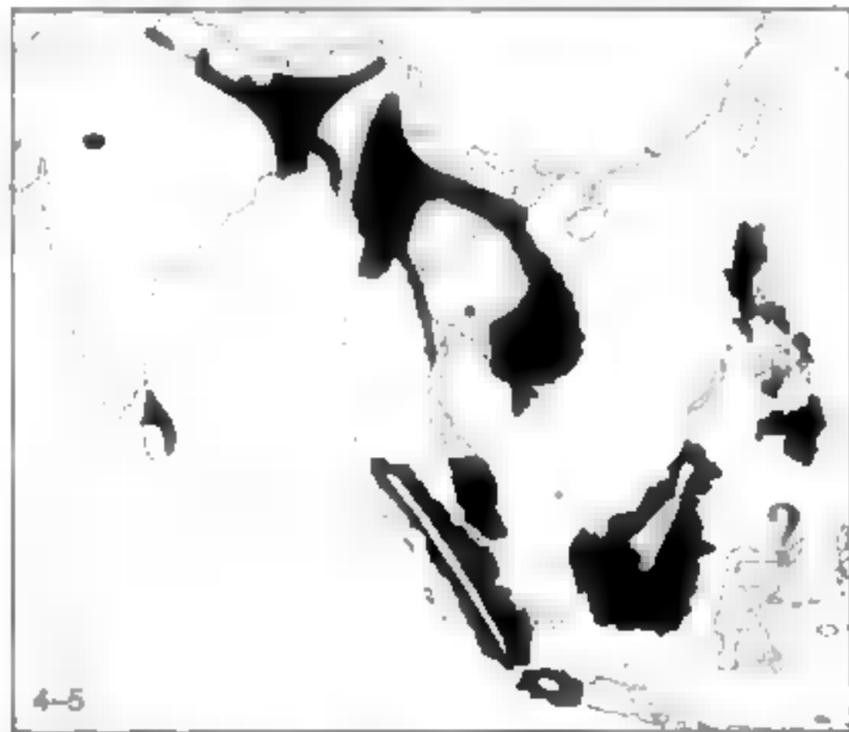
(1987), Deignan (1945, 1963), Inskipp & Inskipp (1991), King *et al.* (1975), Mackinnon & Phillipps (1993), Medway & Wells (1976), Mees (1967), Meyburg & van Balen (1994), Meyer de Schauensee (1984), Round (1988), Smythies (1981, 1986), Stresemann (1940a), van Balen (1994), van Marle & Voous (1988), Wells (1999), White & Bruce (1986).

## 51 GREY-HEADED FISHING-EAGLE *Ichthyophaga ichthyaetus* (Horsfield, 1841)

Plate 18

Other names: Grey-headed Fish-eagle, Greater Fishing-eagle, Tank Eagle (Sri Lanka)

**DISTRIBUTION** Indomalayan (38°N to 6°S); order 4–5; wide distribution, but generally uncommon to rare and local, India and southeast Asia to Malaysia, western Indonesia, and Philippines; Sri Lanka (north and east, but not common), peninsular and northeast India (north to east Rajasthan, Uttar Pradesh, Bihar and Assam), Nepal (rare and local) and Bangladesh (uncommon and local), through Thailand (south only, rare and local), Laos (rare), Vietnam and Cambodia (both scarce); and peninsular Malaysia to Sumatra (including Mentawai, Riau and Lingga archipelagos), Java (very rare), Borneo (scarce in Brunei, only few records from whole of Kalimantan), Sulawesi (rare and local, indeed presence confirmed only in 1990), and Philippines (at least Luzon, Cebu, Mindoro, Samar, Negros, Mindanao, Basilan and Bongao but generally uncommon).



**MOVEMENTS** Sedentary; juveniles presumably dispersive to some extent.

**HABITAT** Slow-moving rivers, lakes, irrigation tanks (reason for alternative English name in Sri Lanka), paddyfields, marshes, and coastal lagoons and estuaries, in forested and wooded lowlands, locally higher. Mostly sea-level to 300 m, but locally to 1,500 m.

**FIELD CHARACTERS** Smallish to medium-sized but quite bulky fish-eagle, as adult grey-brown and white, with strong bill, small head on longish neck, not especially long wings, rounded tail, and shortish legs with unfeathered tarsi and long talons. Rather sluggish; usually perches very upright on bare branches overlooking rivers and ponds; wing-tips reach less than half

down tail. Sexes similar, but female usually larger (up to 23%) and apparently much heavier; juvenile distinct; immatures intermediate in second (and third?) years.

**PERCHED Adult** Head and neck brownish-grey to grey; otherwise dark brown above, palest on mantle and darkest on wings, with blacker primaries; tail white but for clear broad blackish subterminal band; breast brown, clearly demarcated from white belly, thighs and crissum.

**Juvenile** Head and neck more or less brown, greyer on sides and throat, with buff supercilia and whitish streaks; rest of upperparts darker brown, edged greyish, and secondaries faintly barred; tail whitish, mottled and obscurely barred with brown; richer brown breast and flanks broadly streaked with white, shading into brown-mottled white belly and thighs. **Second(third?)-year** Somewhat intermediate (see under Flight). **Bare parts** Adult eyes yellow, juvenile brown, later mottled brown and yellow. Cere grey-brown to blackish-grey. Legs greyish-white to dull pale yellowish-grey.

**FLIGHT** Medium-large raptor with small but well projecting head, broad wings, and rounded tail; adult and juvenile wing shapes comparable to Lesser Fishing-eagle [50] but, in proportion, wings relatively slightly shorter and tail longer; wingspan 2.2 times total length. Heavy-looking flight, 'wing-beats sharp and full'; apparently glides and soars on flattish wings. **Adult** Mainly dark brown above, with greyer head to upper mantle and blacker primaries, but clear-cut blackish subterminal band on white tail; below, white tail-base joins white belly, thighs and crissum as large and sharply defined patch in contrast to blackish subterminal, all-brown underwings, richer brown breast and greyer head. **Juvenile** Paler and much less clearly patterned, with slightly serrated wing-edges; above, streaky brownish head and obscurely brown-banded whitish tail clearly lighter than greyish-edged dark brown back and wing-coverts and obscurely darker-banded secondaries; below, though brown-banded at tips, largely white flight-feathers stand out, together with more or less white lower belly and crissum, in contrast to conspicuously whitish-streaked brown breast and flanks, mottled wing-linings and thighs, and obscurely barred tail. **Second(third?)-year** Intermediate, with greyer head, clearer subterminal tail-band (though still brown-mottled base), whiter and more clear-cut belly and thighs; still much white at bases of primaries and outer secondaries.

**CONFUSION SPECIES** Broadly sympatric Lesser Fishing-eagle [50] more associated with foothills and fast-flowing waters, but quite similar in general pattern and, though less bulky, its larger northern race overlaps in measurements (but not apparently weights); adult

distinguished by darker tail with obscure subterminal band and, in flight, by small white flashes at bases of primaries; juvenile by darker head (no pale supercilia) and breast (whitish streaking very inconspicuous), more clear-cut white flanks, belly and thighs (no brown mottling), darker tail, and lack of extensive white on flight-leathers; last two features also valid in immature stages. Because of similarities in adult tail patterns, habitat and feeding behaviour, Pallas's Fish-eagle [46] is also possible confusion, but larger, with much longer, narrower wings (tips much less short of tail-tip), dark abdomen, thighs and crissum, and paler head. See also juveniles and immatures of Pallas's, and of White-bellied Fish-eagle [42].

**VOICE** Noisy in breeding season, often calling also at night. Descriptions include wet/d clanging cry, loud and far-carrying, like laugh of Indian Grey Hornbill *Tockus bimstris*, uttered singly or in series, on wing or from hidden perch; loud gurgling *awh-awhr*, and *chee-warr* repeated 5–6 times; owlish *ooo-wok, ooo-wok, ooo-wok...* and high-pitched scream.

**FOOD** Almost entirely fish, including any already dead; but occasionally also reptiles, terrestrial birds (e.g. junglefowl *Gallus*) and small mammals (e.g. squirrels). Chiefly still-hunts from waterside branches, dropping to snatch prey at or near surface, but also quarters over stretches of river or corners of lakes. Fish too heavy to lift may be dragged to bank.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Soars little. No other aerial displays described.

**BREEDING** November–May (October–June) over much of mainland range, but chiefly from December in Sri Lanka; April in Sumatra; probably August in Borneo. Huge stick nest, up to 1.5 m across and, with repeated use, up to nearly 2 m deep, lined with green leaves, at 8–30+ m in, or near top of, large tree, which

may be in forest or standing alone, but always by or near water. Clutch 2 (2–4). Incubation 28–30 days. Fledging c70 days.

**POPULATION** Though scattered over more than 5 million km<sup>2</sup> – more than twice the area of Lesser Fishing-eagle [50] and not so highly specialised in habitat requirements – total population may not be much greater. Very little information on numbers, but thought to be about 40 pairs remaining in peninsular Malaysia. Rare now in most of mainland southeast Asia (where formerly widespread and quite common), very rare in Java and, at best, uncommon in other Indonesian and Philippine islands, its stronghold now might be said to be northeast India, where two or three decades ago 'widely but sparsely distributed' and still 'locally frequent'. But deforestation, disturbance, pollution, over-fishing and persecution have certainly caused marked declines in past quarter-century and it may be unrealistic to assume total population higher than somewhere around five-figure mark.

**GEOGRAPHICAL VARIATION** Monotypic. Birds from Sri Lanka and southern India, averaging marginally smaller, have been separated as '*plumbeiceps*', but doubtfully distinct.

**MEASUREMENTS** ♂ wing 420–455 mm, ♀ 445–518 mm; ♂♀ tail 232–280 mm, tarsus 85–140 mm. **Weights** ♂ 1.6 kg (one), ♀ 2.5–2.7 kg.

**REFERENCES** Ali & Ripley (1978), BirdLife International (2000), Bishop *et al.* (1994), Brown (1976), Deignan (1945, 1963), Dickinson *et al.* (1991), Eze & Gougue (1982), Harrison (1990), Hens (1998), Holmes & Burton (1987), Hoogerwerf (1948, 1965), Inskipp & Inskipp (1991), King *et al.* (1975, 1980), Lekagul & Round (1991), Mackinnon & Phillipps (1993), Medway & Wells (1976), Riles (1938), Round (1988), Smythies (1981, 1986), Thiollay and Meyburg (1988), van Marle & Voous (1988), Wells (1999), White & Bruce (1986), Wilkinson *et al.* (1991b).

## Accipitridae (f: Palmnut Vulture)

### 52 PALMNUT VULTURE

*Gypohierax angolensis* (Gmelin, 1788)

Plate 16

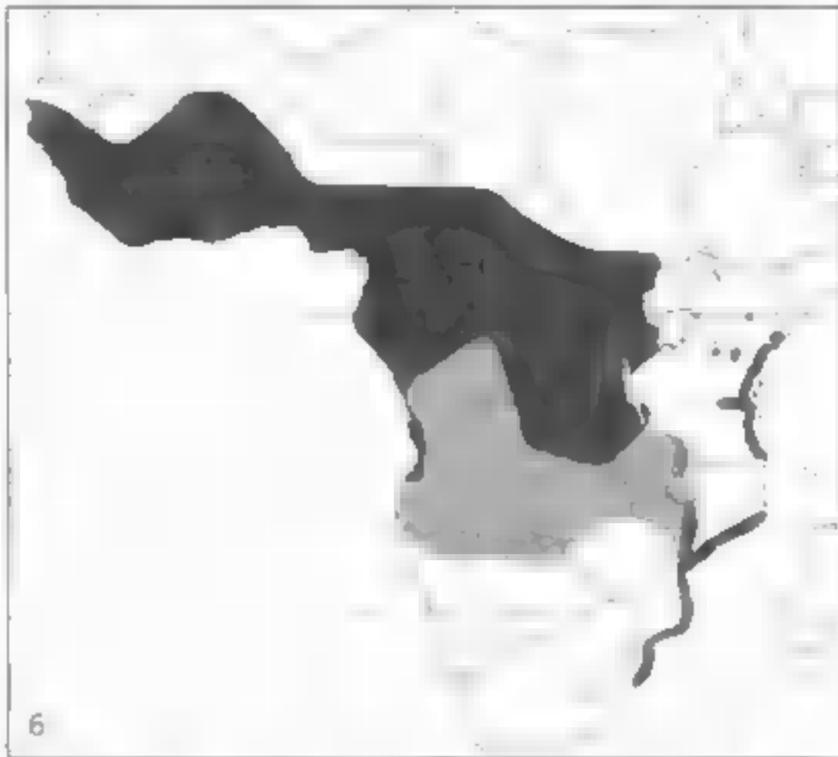
Other name: Vulturine Fish-eagle

**DISTRIBUTION** Afrotropical (15°N to 29°S, mostly 10°N to 10°S); order 6; uncommon to rare in south and very local in east (occasionally numerous, as on Pemba), but widespread and locally abundant from West Africa to Angola. Sub-Saharan Africa: Senegambia, south Mali, central Nigeria, and southernmost Chad and Sudan southwards, mainly to west of western Rift Valley, to Angola, Zambia, Mozambique and extreme north-eastern South Africa (Zululand); also largely coastal East African population in east Kenya, northeast Tanzania, Pemba and Zanzibar.

**MOVEMENTS** Adults sedentary, staying within home areas of few kilometres or making no more than local movements in response to felling or flooding. But young

birds wander more widely; immatures straggle 300–400 km northwards into Sahel and, at other end of continent, into Namibia, Botswana, Zimbabwe, Lesotho and eastern and southern South Africa, up to 1,300 km from southernmost breeding area.

**HABITAT** Forest, tall woodland, or mixed forest and cultivation, especially where oil or raffia palms *Raphia* available and often near springs, streams, rivers, lakes, swamps or mangroves; spreads into maturing oil-palm plantations, but generally in lower numbers with need for waterside natural forest to breed; also, however, found in wooded savannah well away from water and, rarely, even where food palms absent. Often near habitations, allowing close approach without being particularly tame or obvious, but some aversion to larger settlements. Sea-level to 1,500 m, locally 1,800 m.



**FIELD CHARACTERS** Medium-sized raptor, as adult black and white with red face, that may be regarded as aberrant vulture, fish-eagle or even snake-eagle, having some resemblances to, and great differences from, all three; powerful and relatively long bill, sloping forehead, smallish head well feathered (nape looking smooth or slightly crested) but for rough bare face-sides and moustaches, rather long neck. Often perches on tree top with neck erect, and sometimes down at water's edge drinking and bathing; tips of short wings just exceed tail-end. Sexes similar, female barely averaging larger, juvenile distinguishable; will breed in fourth year, but not fully adult until fifth.

**PERCHED Adult** Mainly white (sometimes stained rusty), with black scapulars, greater wing-coverts, secondaries and tail-base (some white adult contour-feathers have black shaft-streaks, this not apparently connected with age); at distance from sides or back, foreparts look all white and rear parts black; bare face orange to red (colour affected by emotional state and consumption of palm fruits). **Juvenile** Various shades of brown; paler on head, wing-coverts and underbody, with yellow-brown rump, darker on back and scapulars; blackish-brown flight-feathers and tail; bare face yellowish-grey to brownish-yellow. **Immature (second- to fourth-year)** In successive plumages, distributions of lighter and darker areas recall adult from second year, but remain mottled whitish and unevenly dark brown until fourth, becoming fully adult in fifth. **Bare parts** Adult eyes yellow, juvenile dark brown, becoming yellow-brown by second or third year. Adult cere pale grey-blue (and bill yellowish), juvenile yellow-grey, becoming grever. Adult bare face-sides red or orange-red, juvenile yellow-grey or brownish-yellow, turning flesh and then yellow by third or fourth year. Adult feet dull orange to brownish-yellow, juvenile dull whitish to grey-brown, becoming tinged yellow by third or fourth year and then pinkish-flesh.

**FLIGHT** Medium-sized raptor with well projecting head on long neck, broad wings with short rounded hands (indentation at inner primaries), short rounded tail. Although soaring high at times, particularly in display, mostly seen perched or flying from tree to tree, or out over water, with curiously fast flaps interspersed with hurried glides. **Adult** White with boldly contrasting black secondaries, primary tips, greater upperwing-coverts, alulae and tail (the last broadly white-tipped). **Juvenile**

Brown, with darker back, tail and flight-feathers. **Immature** By second year, already paler with contrastingly dark secondaries, whitish-based primaries and white-tipped dark tail.

**CONFUSION SPECIES** Adult almost unmistakable, but extensive white sometimes causes brief confusion with adult African Fish-eagle [41] (chestnut, not white, shoulders and abdomen) or Egyptian Vulture [54] (slender, thin-billed, long-tailed, with much less black), both with quite different flight pattern. Brown juvenile often said to need distinction from immatures of various smaller and more or less brownish vultures and eagles, but these all have very different shape, whether perched or flying: smaller bill or bigger head or longer tail and wings. Perhaps care occasionally needed with juvenile Hooded Vulture [55] (much thinner bill, bare throat, downy head and neck, longer wings, slower flaps), which often roosts with Palmnut, or African Gymnogone [89] (much slimmer, with longer wings, tail and legs, maned head, barred or brown below in flight), which also feeds on palmnut husks, locally even to greater extent.

**VOICE** Generally regarded as rather silent, but utters low growl when feeding and duck-like quacking at roost, while various cawing (territorial?), hissed whistling (courtship), barking and other guttural sounds produced in different contexts.

**FOOD** Fruit, also fish, crabs, amphibians, invertebrates; some mammals, birds, reptiles, carrion. One of only two significantly frugivorous raptors: eats fleshy parts of, especially, fruits of oil palm *Elaeis* and raffia palm *Raphia* which, together with wild dates, upas and occasional other fruits, form 58–65% of adult diet (juveniles up to 92%); grain and acacia seeds also recorded. But cannot strictly be classed as vegetarian, since it also takes many small fish, crabs, amphibians (particularly tadpoles), and molluscs (especially giant land snails) and other invertebrates (dung-beetles, locusts, alate termites), also some small mammals and fewer birds (locally even parrots caught in flight) and reptiles, as well as roadkills (often snakes) and other carrion, though rarely seen at big carcasses with other vultures. In some parts of East Africa, fish and crabs probably form bulk of food. Animal prey caught by still-hunting from perch, or by forays or longer patrols out over water (small fish snatched from surface in flight) or ground-walking in mangroves and at watersides and sites of grass fires. Without need for thermals, forages in all weathers, spending an estimated 40% of time after animal food and 60% after fruits. Clambers about in tree to reach fruiting cluster and either swallows individual oil-palm fruits whole or plucks them one by one, holding each in foot to strip off skin and eat the oily orange mesocarp; raffia fruits have to be descaled before the equivalent thin yellow pulp can be reached. Feeds mainly in early morning.

**SOCIOSEXUAL BEHAVIOUR** Often seen singly, or in pairs with one juvenile, but where common may feed and roost socially in parties of up to about 10, and juveniles in slightly larger groups. Aggressively territorial when breeding, flying straight at intruding conspecifics with characteristic rapid beats, but not towards conspecifics or other raptors while feeding (when recorded attacking only such food competitors as hornbills and monkeys). Aerial displays more acrobatic than most

typical vultures: male or pair together soar in aerial displays, sometimes stooping with loud rushing sound, or rolling over and presenting claws.

**BREEDING** October/November–April/May in West and Central Africa, May–November/December in Angola, June–December/January in East Africa, August–January in Zululand. Large stick nest 60–90 cm across and 30–60 cm deep, lined with leaves, sisal, palm racemes and dung, at 6–60 m in palm, baobab, silk cotton or other tall tree. Clutch 1. Incubation estimates 35–50 days. Fledging 85–90+ days.

**POPULATION** Densities range from 5 pairs/10 km<sup>2</sup> in part of Ivory Coast, 40 birds within radius of less than 1 km in Pemba and 47/km along Angola's Cubal river, and 100–300 pairs in the Gambia, down to maximum of six pairs in Zululand. Commonest west Angola, West Africa, shores of Lake Tanganyika, and Pemba and adjacent East African coast; most numerous of the larger raptors in many lowland forest areas of West and Central Africa. Average 40% (27–48% through year) of Ivory Coast population immature, suggesting high survival of young and therefore possibly short mean adult life of 7–8 years (cf. African Fish-eagle [44]). From these and other data, on conservative allowance of 1 pair/100 km<sup>2</sup> over whole range, population estimated to be 80,000 pairs and, including immatures, total of 240,000 birds in early 1990s (Mundy *et al.*). At some risk from habitat

destruction in West Africa, despite subsequent spread of oil-palm plantations (which mature in five years and continue fruiting for 25–30 years): birds feed in them but, perhaps because of harvesting disturbance, do not nest there; they also need local availability of aquatic animal foods, particularly for growing young. Yet range expansion in Angola attributed to oil-palm plantations (the birds nesting in euphorbias and mangroves nearby), and small colonisation in Zululand to similar developments of raffia (which takes 25–35 years to mature and dies after single massive fruiting). Not persecuted, even by oil-palm growers, but some nest failures caused by site competition from African Hobby [296].

**GEOGRAPHICAL VARIATION** Monotypic. Cline of increasing wing and tail lengths from West Africa towards east and south.

**MEASUREMENTS** ♂ wing 387–466 mm, tail 168–252 mm, tarsus 75–85 mm. **Weights** ♂♀ 1.2–1.8 kg.

**REFERENCES** Austen (1955), Benson & Benson (1975), Britton (1980), Brooke & Jeffery (1972), Brown (1982), Brown *et al.* (1982), Bu chart (1989), Chapin (1982), Donnelly & Ginn *et al.* (1989), Gore (1990), Grimes (1987), Irwin (1972), Mackworth-Praed & Grant (1957–73), Maclean (1993), Moreau (1933), Mundy *et al.* (1992), Pakenham (1979), Pickford *et al.* (1989), Pinto (1985), Serle (1954), Serle *et al.* (1977), Snow (1978), Tarboton & Allan (1984), Thiollay (1975a/b/c, 1976a/b, 1977c, 1978a/b, 1981), Thomson & Moreau (1957).

## Accipitridae (g: Lammergeier)

### 53 LAMMERGEIER

*Gypaetus barbatus* (Linnaeus, 1758)

Plate 19

Other names: Bearded Vulture, Ossifrage

**DISTRIBUTION** Palearctic, Afrotropical and Indomalayan (53.5°N to 31°S); order 5; very local and almost everywhere scarce to rare, and generally declining, within range that is greatly reduced since 1940s (see Population). High mountain ranges of southern Europe, Middle East and southern Asia, and northwest, eastern and southern Africa: Pyrenees of north Spain/southwest France, European Alps (reintroduced Switzerland and Italy 1986, after failed 1974 attempt, now spread into eastern France, ?Austria), Corsica, Albania (almost extinct), Greece, Crete and Turkey, through Caucasus and Transcaucasus, southeastward in Iran along Zagros mountains and eastward in Elburz range into Afghanistan, thence northeast through south Kazakhstan and on through Altai (north in south-central Siberia to northeast Sayan mountains) and west China (Sinkiang) to western Mongolia, and southeast through north Pakistan and Himalayas (common) east to Arunachal Pradesh and south-central China (northwest Yunnan to Sichuan, Shaanxi and western Inner Mongolia); also Near East in southern Israel (breeding not proved since 1981), and maybe west and south Jordan, south to Sinai, and northwest and southwest Arabian Peninsula; and in Africa, apart from isolated population in High Atlas

of north Morocco and possibly still northwest Algeria, occurs in mountains bordering Red Sea in east Egypt (very rare) and east Sudan (occasional), in Ethiopian highlands (commoner, especially in north), then from south Sudanese border across northeast Uganda into west Kenya (Mount Elgon, Cherangani), and along eastern Rift Valley peaks in central Kenya down into north Tanzania (south to Mount Hanang), with unconfirmed observations also in Ruwenzori on Uganda/DR Congo border and in south Tanzania, and with further isolated population over 2,100 km to south in Drakensberg mountains of Lesotho extending into adjacent regions of southeastern South Africa.

**MOVEMENTS** Essentially resident within huge home ranges, immatures wandering more widely, though only exceptionally seen away from main mountain ranges of breeding areas; but both juveniles and adults from Pyrenean population recorded increasingly to west and south, even 400+ km away in central Spanish mountains. Vagrancy rare, though recorded in Cyprus and, in 1986, Mozambique (but report from Namibia result of misidentification); wandering immatures from reintroduced stock in Europe have reached North Sea coast of Germany, some 800 km north of Alps.



**HABITAT** Rugged high mountains and inselbergs with plentiful cliffs, crags, precipices, canyons and gorges, often with high alpine pastures and meadows, montane grassland and heath, occasionally lightly or even more heavily forested slopes, as well as steep-sided large rocky desert wadis and high-lying steppes; generally in remote, desolate areas, usually where good populations of mammals such as ibex, mountain goat and wild sheep, and frequently where major predators (e.g. wolves, Golden Eagle [224]) provide feeding possibilities through their prey remains (see Food), but in many areas visits refuse tips on outskirts of villages and in Ethiopia 'common in and near towns and villages'. Occasionally descends to 300–600 m, rarely to near sea-level, but mostly above 1,000 m and in many parts of range not below 2,000 m, often above treeline: in Europe 1,000–2,000 m; in central Asia 2,000–4,500 m, in Nepal normally 1,200–4,100 m but also much higher (even to 7,500 m on Mt Everest) and rarely down to c300 m; in Africa, to 4,100+ m in northwest, 1,800–4,200 m in northeast, 2,000–3,700 m in East, and 1,500–3,000+ m in Lesotho and southeastern South Africa.

**FIELD CHARACTERS** Huge vulture, distinctive and with no obvious close relatives, mostly dark greyish, rusty and whitish as adult but juvenile all dark, with

relatively smallish head on long powerful neck, long slender body with markedly long wings and tail, shortish more or less feathered legs, strong feet. Often wary. Perches obliquely or horizontally, looking characteristically hunch-shouldered, openly on rock or crag, rarely on tree branch, and walks with waddling gait on ground; wing-tips fall short of to well short of tail-tip. Sexes similar, female barely averaging larger; juvenile distinct; not fully adult until fifth–sixth year or older.

**PERCHED Adult** Above, uniform dark grey-blue to grey-black with paler shaft-streaks, tail only little darker; creamy forehead/forecrown and cheeks separated by broad black band around eyes and forward to lores, meeting prominent long, broad black bristles at base of bill ('beard'); rest of head creamy-white or yellowish, face variably blackish-streaked and with black ear-tuft (except in Afrotropical race *meridionalis*; see Geographical Variation), becoming deeper rufous or reddish-buff to orangey on neck and underparts, this colour often darker on throat and neck, and with black streaks or spots on chest forming complete or broken gorget (lacking in *meridionalis*). Note, however, that orange-rufous colour very variable, and in fact cosmetic, acquired by dusting or by bathing in iron-rich spring water, and can be washed or brushed off to reveal actually white feathering; adults with white or creamy underside by

no means unusual, and normal among captive birds.

**Juvenile** Very different: dark grey-brown above, with dark-mottled buffish patch on mantle and pale tips to median wing-coverts, and rather dark dirty buff-brown or brownish-grey below, with contrastingly much darker, blackish-brown, head and neck to upper breast against which shorter beard less obvious; in closer view, crown and cheeks paler, more buff-brown, and upperparts all thinly buff-streaked. **Immature** In second-third years acquires fairly uniform grevish mantle, rump and underparts, and in third-fourth years rufous-cream coloration appears patchily on underparts, but still mostly dark head and some brown feathers above. **Subadult** From about fourth/fifth year much as adult, but some dark markings on head, sometimes dark half-collar, and some brown feathering on upperparts and wings. **Bare parts** Adult eyes creamy to yellow with red to dark orange sclerotic membrane, juvenile grey-brown to red-brown with orange-red membrane. Cere (mostly concealed by beard) and narrow eye-rings blue or light blue-grey. Adult feet lead-grey, juvenile paler or yellow-tinged.

**FLIGHT** Very big raptor with unmistakable silhouette (at long range, proportions recall huge falcon): markedly protruding head and neck, very long narrow wings (arms parallel-edged, hands tapering to pointed deep-fingered tips), and slender elongate body ending in distinctively long diamond-shaped tail which is clearly longer than wing-base (juvenile and young immatures, with longer secondaries and often abraded, shorter, tail, less striking if still imposing); wingspan 2.4 times total length. Typically patrols slopes in prolonged and graceful slow-speed flight, spending most of day airborne; soars on flat wings or with slightly lowered hands with well-spread fingers, hands more depressed in glide; takes off with markedly slow, ponderous, elastic beats, but active flight rarely used, then two to three shallow flaps per second.

**Adult** Dark grevish-blue to blackish above, looking black at any distance (somewhat darker tail and trailing wing-edges and wing-tips never obvious, pale streaks visible only close to); below, rufous to orangey or, at times, more creamy-buff or whitish underbody with variable dark gorget (lacking in *meridionalis*), and including pale armpits, contrasts dark underwing on which lesser and median coverts and trailing edges and fingers blackish but greater coverts and flight-leathers slaty to grey-brown, while tail dark brown- to blackish-looking; pale head with black eye-mask always striking, and beard visible at surprisingly long distances (300+ m). **Juvenile** Above, dark grey-brown and fairly uniform (paler upperpart streaks generally show only at closest ranges), but with mantle mottled whitish-buff and dark brown and with irregular and normally incomplete creamy band across median coverts; below, dirty buff-brown or brownish-grey body and wing-linings, grey-black quills and darker wing-tips produce some contrasts, but rather uniform-looking at distance; in any view, blackish-brown head to upper breast always darkest part (at close quarters, with paler crown and cheeks), while beard short and far less striking than adult's. **Immature** Initially much as juvenile, but by third year generally more or less uniform grevish mantle and rump contrasting with otherwise brown upperparts, and uniform grey underbody against darker brown-grey underwing and blackish-looking head/upper breast and tail; in third-fourth years

some creamy-rufous shows on underbody; by fourth year similar to adult but for dark head and variable amount of brown juvenile plumage above and in wings. **Subadult** Largely indistinguishable from adult, though may show variable dark neck-collar and perhaps traces of dark brown on upperbody and wings.

**CONFUSION SPECIES** In reasonable view quite unmistakable, as both shape and plumage unlike any other raptor. Dark juvenile/immature (slightly broader-winged, shorter-tailed than adult) seen poorly or briefly or at distance, especially if size hard to assess, could be mistaken for young Egyptian Vulture [54]; that, however, not only considerably smaller but also more compact, with proportionately broader and shorter wings.

**VOICE** Generally silent except in display, when gives rather shrill, somewhat peevish whistles, sometimes in twittering series; falcon-like *cheek-eechee-eechee...* at or near nest; also occasional *pe* as contact, and loud chuckles when mating.

**FOOD** Unique and specialised diet combines good proportion of carrion with large quantities of bones, also tortoises, possibly some live mammals and birds; flesh probably preferred, but bones can form up to 85% of diet. Carrion mostly smaller remnants, any scraps of meat or skin it can obtain, as does not compete with other vultures but waits patiently at edge; prefers fresh meat but, if food scarce, will pick at older carcasses and scavenge offal; uneaten carrion often stored at eyrie. Eats both small and large bones, up to c10 cm in diameter; small ones swallowed whole or, if brittle, first 'bitten' through; larger bones lifted in feet and carried in air (able to carry up to 4+ kg, almost own weight) to area with hard and usually flat rocks, then dropped from heights of 50–80 m (150 m), repeatedly if necessary (up to 20 times, and 50 times reported), on to hard rock



**Fig. 29.** Lammergeiers *Gypaetus barbatus* [53] break bones – to feed on the pieces and the marrow – by carrying them aloft in their feet, usually to heights of 50–80 m, and dropping them on to rocks, repeatedly if necessary.

surface until shattered, bird turning into wind and immediately spiralling or diving to ground to feed on fragments and marrow; same bone-dropping sites, known as ossuaries, used for decades, probably centuries. May also hold bones in bill and hammer them on ground. Habits have earned species colloquial name of 'bone-breaker'. Tortoises regularly taken where abundant, and normally treated in same way as large bones. Mammals include rock hyraxes, marmots and hares (hyraxes, at least, also lifted to height and dropped on to rocks to kill them), as well as larger species such as ibex, mountain goat, chamois and steinbok; these last sometimes reported as attacked by beating wings until forced off cliff ledge, but equally likely that vulture merely inquisitive and its sudden appearance startles mammal, which, especially if sick or injured, loses footing, as surely the case also with claims of humans similarly attacked (virtually all long-distance observations). Birds mainly partridges *Alectoris* and pheasants, and some pigeons, possibly all taken as corpses, though these also may at times be attacked with beating wings. Forages over vast area of many hundreds or several thousands of square kilometres in slow-gliding flight, often as well-spaced pair, 2–4 m above ground or c50 m above ridge, at times soaring higher, and along routes which followed very regularly (both temporally and spatially) each day for up to several months: it has been calculated that individual may cover as much as 700 km in one day. By contrast, also scavenges at rubbish dumps around villages, and at larger tips and carcass dumps in towns, commonly so in some places: in Ethiopia, regularly enters towns in some numbers.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs, sometimes polyandrous trios; where relatively not uncommon (e.g. Ethiopia), 20+ may assemble at dump or other food source. Aerial displays, all accompanied by calling, include high-speed pursuits and mutual high-circling, with mates swapping positions, lower one sometimes rolling over and showing talons, either display occasionally followed by talon-interlocking and cartwheel in which the two spiral down almost to ground; also undulating sky-dance involving steep ascent to high altitude and fast dive, and high-speed twisting and rolling flight past nest site.

**BREEDING** December–September in Eurasia and north Africa, December–June in Indian subcontinent, October–May in Ethiopia, throughout year in various parts of East Africa (mostly April–November in Kenya), and May–January in southern Africa. Massive pile of branches, averaging 1 m across and 60 cm deep but respective dimensions can reach 1.5–2.5 m and 1 m, well draped and lined with wool, dung, dried skin and sometimes rubbish, in inaccessible site high up (to 700+ m) on overhung ledge or in smallish cave on usually vertical or near-vertical cliff face; re-used in successive years, or several nests within territory used alternately. Clutch 2 (1–2, but 3 reported rarely in north India). Incubation c55–60 days. Fledging 100–130 days, with dependency up to one year.

**POPULATION** Known densities almost everywhere extremely low as pairs occupy immense home ranges, e.g. about 1 pair/625 km<sup>2</sup> in Lesotho; highest in Ethiopia (locally, probably 1 pair/100 km<sup>2</sup>) and in parts of

Spanish Pyrenees (1.9/100 km<sup>2</sup>, though averaging less than one-third that in suitable habitat across whole Pyrenees). In most of its range this is a rare or very rare vulture, its presence or otherwise dictated by environmental factors (see Habitat, Food). Recent estimates (mid 1990s) for West Palearctic indicate 400–900 pairs, of which c100 in western Europe (76 in Pyrenees, 12–18 in Greece, eight in Corsica, perhaps a couple in Albania), 100–500 in Turkey, 30 in European Russia, 30–40 in Azerbaijan, 22–25 in Georgia, 12–15 in Armenia, maximum of 100 in Atlas mountains (Morocco, probably extinct or nearly so Algeria) and perhaps fewer than 10 in Egypt; apparently still relatively numerous in early 1990s in northeast Africa, where vast majority of estimated 1,400–2,200 pairs in Ethiopia, but only 50+ pairs to south in Rift Valley of Uganda/Kenya/Tanzania, while 204 pairs in southern Africa of which 122 in Lesotho. No meaningful figures for Asian range, where species's patchy distribution must cover at least 3.5 million km<sup>2</sup> from Afghanistan eastward, and abundance varies greatly (e.g. 'extremely rare' in south-central Siberia, scarce in Pakistan, though reported as 'common' in parts of Himalayan chain such as Himachal Pradesh above 4,000 m and most of western Nepal), but overall average of 1 pair/600 km<sup>2</sup> would give population of 5,000–6,000 pairs. Those, added to figures and estimates for rest of range, would produce world total of fewer than 10,000 pairs. In all three continents of its range this vulture has declined massively over last two centuries, nowhere more so than in Europe, where formerly bred in south Spain, throughout Alps and Carpathians, down through Balkans, and on most Mediterranean islands; was also widespread resident across mountain ranges of Middle East and central Asia, while in Africa nested in suitable habitat throughout northern Africa and extended more widely in eastern and southern parts. Current information points to continuing downward trend, in Europe to extent that conservation action now a major priority. Single exception is in Pyrenees, where, of 76 known pairs in 1994, 80% were in Spain, which held 61 territories, over one-fifth of those occupied by trios (female, two males), and 51 nesting attempts were made; Spanish population more than doubled between 1986 and 1994, and slight increase noted also on French side of those mountains. Further positive factor provided by successful reintroduction, from 1986, in Swiss and Italian Alps: 50 captive-bred juveniles released up to 1993, c20% survived, and population spread to colonise French section (first successful breeding in Haute Savoie in 1997). Main causes of decline, and continued threats, appear to be poisoning from baits set for carnivores, direct persecution, degradation of habitat, disturbance in breeding areas, inadequate food supply and collisions with power lines. Pyrenean increase thought to be result of improved food supply and thus reduction in mortality, especially of juveniles and immatures; provision of feeding stations coupled with better protection could aid species's survival throughout its world range.

**GEOGRAPHICAL VARIATION** Over 13 races described, but most on flimsy grounds or inadequate information. Only two recognised here, although nominate *barbatus* is often held to be restricted to northwest Africa, which then means distinguishing the (on average) marginally larger and more strongly marked birds of

the main Eurasian population as 'aurus', while the largest of all in the high mountains of central Asia to Himalayas are still sometimes separated as 'hemachalensis' or, better, 'alticus'.

*G. b. barbatus* (northwest Africa and Eurasia) Black eye-patches joined by band across hindcrown, black ear-crescent, variable black face-streaks (filoplumes), broken or complete black gorget, tarsi fully feathered.

*G. b. meridionalis* (Egypt and Arabia to East and South Africa) Averages smaller, eye-patches not joined, no ear-crescent, few or no face-streaks, no gorget (rarely hint of one), lower 4–5 cm of tarsi unfeathered.

**MEASUREMENTS** *G. b. barbatus* ♂ wing 725–885 mm, ♀ 715–910 mm (averages larger in central Asia); ♂ tail 470–520 mm, ♀ 470–510 mm; ♂ tarsus 94–100 mm, ♀ 92–98 mm. *G. b. meridionalis* ♂ wing 745–787 mm, ♀ 715–810 mm; ♂ tail 427–460 mm, ♀ 437–469 mm; ♂ tarsus 88–93 mm, ♀ 89–93 mm. (Averages for 21 live birds in Drakensberg, ages and sexes combined: wing 782 mm, tail 474 mm, tarsus 95.) **Weights** *G. b. barbatus* ♂ 4.5–7.0 kg, ♀ 5.6–6.7 kg, unsexed 4.8–7.2 kg. *G. b. meridionalis* 21 live birds in Drakensberg, ages and sexes combined, 5.2–6.25 kg, 8 adults average 5.7 kg.

**REFERENCES** Ali & Ripley (1968), Anderegg (1982), Atwell (1963), Bates (1999), Belik (1984, 1985, 1990), Bergier (1987), Blumstein (1990), Bowwall (1970), Boudoin (1976), Bouvet (1985), Brown (1985, 1989a, 1990a/b, 1991a), Brown & Bruton (1991), Brown & Plug (1990), Brown *et al.* (1988), Brown (1977), Brown *et al.* (1982), Canut *et al.* (1987), Clancey (1985), Clark & Schmitt (1999), Clouet (1984), Cramp & Simmons (1980), Delibes *et al.* (1984), Dendaletche (1988), Donazar (1993), Elósegui (1989), Etchécopar & Huc (1978), Fasse *et al.* (1989), Fleming (1955), Flint *et al.* (1984), Forsman (1999), Frey (1992), Frey & Bijleveld (1994), Gænsbol (1986, 1995), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Grimmett *et al.* (1998), Grubar (1991), Hagemeyer & Blair (1997), Handrinos (1985), Handrinos & Demetropoulos (1983), Handrinos & Akriotis (1997), Heredia & Donazar (1990), Heredia & Heredia (1991), Hiraldo *et al.* (1979, 1984), Hollom *et al.* (1988), Houston *et al.* (1993), Huxley & Nicholson (1963), Inskipp & Inskipp (1991), Kemp & Kemp (1998), Kumerloewe & Géroudet (1964), Müller (1988), Mundy *et al.* (1992), Newman (1969), North (1944, 1948), Parellada (1984a), Penzhorn (1969), Pollard (1947), Porter *et al.* (1981, 1996), Roberts (1991), Rogacheva (1992), Shirihai (1996), Smith (1965), Stegmann (1961), Steyn (1982), Suetens & van Groenendael (1972), Terrasse (1985), Terrasse *et al.* (1961), Thihaull *et al.* (1993), Thiollay (1968a/b), Vasic *et al.* (1985), Zimmerman *et al.* (1996)

## Accipitridae (h: true Old World vultures)

### 54 EGYPTIAN VULTURE

*Neophron percnopterus* (Linnaeus, 1758)

Plate 19

Other names: Indian or White Scavenger Vulture

**DISTRIBUTION** Palearctic, Afrotropical and western Indomalayan (48°N to 5°S, very locally to 19°S, formerly to 34°S); order 5+; decreasing and, even if still common in some parts, now often rare in West Palearctic, and declining or extinct in some African countries, but elsewhere in Africa and southern Asia still common and even locally abundant. Atlantic islands, Africa, southern Europe, southwest and south Asia: Cape Verdes, Canaries, northwest Africa, Spain, southern Balkans and Asia Minor, and much more locally in most other Palearctic African and south European countries north to southern France, southern Ukraine, Crimea and Caucasus; thence through Iran, Afghanistan and Pakistan north into Transcaucasia, Aral and Balkhash in Kazakhstan, and east to Tien Shan, and through most of India east to West Bengal and north to Himalayas, including Nepal; in Afrotropical region, widespread in UAE and Oman, central and western Saudi Arabia and southwest Yemen, and thence in mainly Sahel band from Ethiopia west to Senegal and south to Kenya and north Tanzania; few pairs Angola, probably Namibia, possibly Mozambique; formerly also South Africa, where now exceedingly rare if not extinct.

**MOVEMENTS** Sedentary or nomadic in Atlantic islands, Saharan mountain massifs, sub-Saharan Africa, south Arabia and southern Iran through India, but mainly migratory in Palearctic and moves altitudinally in Himalayas. Leaving chiefly mid August–mid September (late July–early October) and returning February–April (late

January–early May), most European birds use Gibraltar and Bosphorus–Levant routes around Mediterranean and, along with north African populations, cross Sahara; but small numbers of European birds now winter regularly in Mediterranean basin north to south France, south Italy, Balkans and west Turkey, perhaps most notably in Balearics. Central Asian populations, or at least a significant proportion of them, may also winter in south Iran, south Arabia and East Africa rather than India. Many immatures probably remain south of Sahara until at least three to four years old. Vagrants (mostly old records) north to Azores, Madeira, Britain, Fennoscandia and west Siberia, and south to Sri Lanka.

**HABITAT** Over most of range, nests on cliffs, crag and other rocky outcrops; otherwise, lives and forages mainly in any lowland or montane open country, often in arid regions but also along beaches, river sand-banks and wetland edges, and frequently near human habitation: thus, desert edge, the African Sahel, high rocky plains and ravines, steppe and other grassland, open savannah (but not closed woodland), cultivation, rubbish dumps, harbours and villages. Indian race (see Geographical Variation) more closely associated with human settlements, even urban centres, also nesting regularly on ruined buildings ('dilapidated mosques, tombs... ancient forts') and sometimes in large trees. Sea-level to 4,500 m, but mostly below 2,000 m or, more locally, 3,000 m; extremes 3,600 m in Caucasus, 3,800 m in Himalayas, and 4,500 m in Ethiopia.



**FIELD CHARACTERS** Small, slight, scruffy vulture, mainly dirty white as adult and brown as juvenile, with thin bill, bare face and sides of head to foreneck, leaving conspicuous ear-holes, untidy ruff of elongated feathers on back and sides of neck, relatively long legs, and wedge-shaped tail. Perches openly and alertly, often with neck upright, on any prominence, such as cliff, rock, building or post, less frequently on tree, but often on open ground; longish wings reach tip of tail; walks with body fairly horizontal and waddling gait, and runs quite easily. Sexes similar, and female barely averages larger, though perhaps 10–15% heavier; juvenile and immature stages distinguishable.

**PERCHED Adult** General effect basically white, apart from bare orange-yellow face (forecrown, sides of head to ear-holes, throat and separate chest-patch) and more or less contrasting black or brownish primaries, primary coverts, inner greater coverts, and bases to greyish secondaries; but ruff of elongated feathers of nape and neck-sides naturally rich cream to yellow-buff, and mantle, scapulars and breast also creamy-yellow but paler, while neck and underparts in particular (and sometimes whole body) may be dirtied grey or brownish-buff or ferruginously stained rusty-buff. **Juvenile** Largely dark brown, apart from whitish-grey face and very variable pale tips to scapulars, median and greater wing-coverts, and crissum (which can form bold whitish braces, forewing shoulder-patches and rear abdomen, or be almost completely missing through wear). **Second-year** Mainly dark like juvenile, but base of bill yellowish-pink, neck blackish-brown, body and wing-coverts more evenly mottled by

pale grey or tawny tips, and new flight-feathers stand out as much greyer. **Third-year** Much paler; face yellow, ruff more extensive and mixed with long white feathers, body and wing-coverts mix of new whitish, buff and tawny feathers and old brown ones. **Fourth-year** Now much like adult, but some brown feathers remain on mantle and wing-coverts, and tail mix of white and old grey-buff feathers. **Bare parts** Adult eyes dark brown to yellow or even orange-red (related to sex or age?), juvenile brown. Adult face and cere orange-yellow, extending to base of black or black-tipped bill (bill all yellow in most of India; see Geographical Variation); juvenile whitish-grey, extending to base of brown bill; second-year grey with yellowish-pink cere and bill-base; third-year yellow; fourth-year bright yellow. Adult legs pink, bluish-pink or yellow, juvenile blackish-grey.

**FLIGHT** Medium-sized raptor, quite lightly built, with long and fairly broad wings parallel-edged but tapering to narrower six-fingered hands, strongly wedge-shaped tail slightly shorter than wing-bases, narrow head and long thin bill; wingspan 2.7 times total length. Takes off from ground relatively quickly and easily, with rapid but heavy beats, and on wing much earlier than larger vultures; flaps more, too, with stiff wings and high up-strokes; soars on nearly flat or slightly bowed wings; more bowed when gliding, with primaries lowered and angled back. **Adult** Mainly white or pale above – including head, body, tail, most wing-coverts, and outer vanes of secondaries and inner primaries (these producing striped effect along flight-feathers) – but with contrasting blackish distal halves of outer primaries and black primary coverts

extending in narrow bands along bases and tips of secondaries, also more or less grey-brown patch on inner greater coverts; below, all more or less white with contrasting black flight-feathers (but beware that neck, much of underbody and carpal areas in particular often stained grey, brownish-buff or rusty). **Juvenile** Mostly dark brown with evenly serrated trailing wing-edges; paler greyer or tawnier tail (obviously lighter-edged and tipped) and, usually, pale rump and crissum; in fresh plumage, above, light or even white tips form very variably distinct lines down scapulars and along greater coverts, and more solid patches on carpal areas and even on mantle. **Second-year** Still rather like juvenile, but trailing wing-edges uneven because of retention of juvenile outermost primaries and some pointed secondaries, which stand out from rounder-tipped new feathers; though pale feather-tips give grey-brown mottling, looks more uniform above and below without obviously pale rump and crissum, but nape and neck stand out as blacker, while new flight-feathers show up as greyer above. **Third-year** Increasingly pied on body and wing-coverts, above and below; new white and more or less buff feathers mixed with old brown ones; face yellow, and long white ruff-feathers start to contrast with blackish neck, but tail still greyish or tawny with paler edges. **Fourth-year** Distinguished from adult by mainly greyish-looking tail (though partly white), odd brown feathers on mantle and upperwing-coverts, and uneven greyer or browner patches on underwing-coverts (these creating different impression from staining, which may be as extensive as on full adults).

**CONFUSION SPECIES** Adult and older immatures (cfourth-year upwards) almost unmistakable at reasonable ranges, whether settled or flying, because of thin bill, bare yellow face, form of ruff, mainly (dirty) white body and wings and, from below, black flight-feathers and white or whitish wedge-shaped tail. But in far distant or high overhead flight, when details of outline not clear, beware possibility of confusion with thermal-soaring White Stork *Ciconia ciconia* or even certain pelicans *Pelecanus* with similar wing pattern and white or whitish tail that can be made to look slightly wedge-shaped by protruding feet. Only two other raptors of overlapping range that share combination of white underbody and wing-linings, all-dark flight-feathers and plain lightish tail are pale-morph Booted Eagle [230] (smaller, with shorter wings, relatively longer squarish-ended tail, quite different pattern above) and adult White-bellied Fish-eagle [42] (larger, with broader and more rounded wings held in V when soaring, relatively shorter and less wedged tail with blackish base, again different pattern above). Palmnut Vulture [52] may seem comparable on ground, being also white and black, but really very different in shape and pattern, even more so in flight (mainly white primaries, black extending to scapulars and tail-base as well as to whole upperside of secondaries and greater coverts, broad rounded wings and short rounded tail, heavier bill, red face). Younger Egyptian Vultures can be more difficult in flight, though third-year shows enough white feathering for species pattern to be evident. Juvenile and second-year are also easily identified on ground by general shape, thin bill, form of bluish-white facial skin (cf. juveniles of Hooded [55] and Palmnut), but in high flight, being mainly brown,

they can be mistaken for other dark birds of prey: not least, as example, Lesser Spotted Eagle [218], which is similar in size and overlaps in range, at different seasons, in southeast Europe, Middle East, East Africa and India (wings, bowed in glide, have more parallel edges and rounded tips, tail also more rounded, though distinctions not always so clear on juvenile and immature Lessers; see that text for plumage differences). See also Greater Spotted, Tawny and Steppe Eagles [219-221] and other dark raptors. High overhead, outline can recall juvenile Lammergeier [53] (but that is much larger, with more tapered wings, and fuller and relatively longer tail).

**VOICE** Hardly ever heard in wild, but low whistles, groans, grunts and rattling noises appear to express agitation or anger, and lively tremulous *gr gr gr gr gr...* increasing in pitch and speed, high excitement. Incubating or brooding bird will hiss and snap bill at human intruder. Other noises described include 'long grating sounds' during copulation and, for Indian race, 'disagreeable whining mew'; mew also recorded in Africa. 'High-pitched and tremulous cries' apparently sometimes uttered in display-flights (see Sociosexual Behaviour).

**FOOD** Opportunist scavenger with slender bill suited to picking up food items, not tearing flesh. So takes wide variety of scraps of carrion, organic waste and other rubbish; to lesser extent, insects and smaller young or injured vertebrates of all classes; most interestingly, will also break eggs of some big birds. If attending any large carcass, does so on the periphery, waiting for the leavings of bigger scavengers; but much more characteristic of rubbish dumps, village edges and markets, and nomad encampments, feeding on all kinds of food scraps, including rotting fruit and vegetables, and often the excrement of human beings and dogs. Forages by low gliding or higher soaring over mainly small distances - though 30-70 km recorded - perhaps watching activities of other vultures and man, but able to spot objects of 4-8 cm diameter from 1,000 m. Will also still-hunt from perch or walk on ground, thus finding frogs and large insects (grasshoppers, beetles, especially wandering locusts and alate termites), or occasionally even wading for spawning or dying fish. At colonies of pelicans and flamingos *Phoenicopterus*, will take sickly or dead nestlings and will break eggs by picking them up and throwing them down, sometimes against stones. Possibly as result of this recognising white eggs as food sources, some individuals have long learnt to throw down stones at eggs, most notably of Ostrich *Struthio camelus*, often missing but eventually breaking them (cf. Black-breasted Kite [36]): stones average about 50 g, and are mostly within range 15-300 g (up to 900 g on record), and may be carried in bill from up to 200 m away; this habit known only locally in Africa, and not in Eurasia except Israel (where one also dropped stone on to tennis ball on rubbish dump).

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in very small parties, but occasionally groups of 10-20 at abundant food sources and at roosts (records of gatherings of 40-200, mostly pre-1960); normally solitary breeder, too. Early in breeding cycle, pair-members often fly together and soaring may then be interpreted as high-

circling. One or both may perform series of dives, sometimes spiralling, and upward swoops that combine into form of rollercoaster display that is much more vigorous than those of most typical vultures. Instances of one diving at the other, which then rolls over and presents talons, have variously been interpreted as sexual or aggressive encounters, and only record of talon-grasping was apparently part of month-long conflict between two neighbouring pairs in Italy.

**BREEDING** In southern Europe and Mediterranean region, end March–early September, slightly earlier in north Africa and Canary Islands; in Cape Verde Islands, December–August; in Nigeria, November–April; in Sudan and Eritrea, February–August, and one month earlier in Somalia; in Kenya, May–December; and in India, mainly February–August, but nests there have been found occupied in all months except December. Nest initially small and shallow heap of twigs and little branches, 60–75 cm across and 20–30 cm deep, but with regular re-use in successive years grows up to 1.5 m across and 75 cm deep; usually filthy and covered with layer of rags, matted hair, skin, mammal dung, paper and other rubbish; typically in cave on crag, sheltered cliff ledge, hole in rocks or old building, occasionally at 4–7 m in large tree where may use another raptor's nest. (In India, also once each on ground at base of tree and at 1.5 m on top of termite mound.) Clutch 2 (1–3). Incubation c42 days. Fledging 70–90 days; young dependent for at least one further month.

**POPULATION** Has declined greatly in many parts of range (not least in Egypt) over past 150 years, and yet holds its own in others: most critical factors are availability of suitable carrion and – not necessarily the same – standards of human hygiene, but in some places this vulture also greatly affected by indiscriminate poisoning of carcasses, by pesticide accumulations, or by shooting (mostly senseless, though some Ostrich farmers in southern Africa used to shoot to protect eggs; see Food). In general, migratory populations have decreased far more than the sedentary ones. Thus, species has declined over much of Europe and Mediterranean Africa (though still numerous in parts of Spain, Morocco and north Algeria), as well as, for example, on Atlantic islands and in Israel (where now slightly increasing again), and is all but extinct in Africa south of equator except in southern Kenya and north Tanzania; yet it remains common farther north in sub-Saharan Africa, especially Ethiopia, and from Turkey through to India. Although becoming more stable, and locally even increasing again, European population is probably now under 2,000 pairs, two-thirds of which are summer visitors to Spain. Some 400–450 pairs estimated in Transcaucasia, and fewer than 2,000 pairs in central Asia. Mostly resident African population (migratory only north of Sahara) has been put at 7,500 pairs or, including non-breeders, 20,000 birds; in northern winter, this total increased by all migrants from western Europe and many from eastern Europe, Turkey and perhaps even Caspian region. This migratory influx has been put at 10,000 birds, including juveniles, but actual figure could be rather higher, depending on true size of Turkish breeding population, which is thought to be somewhere in range 1,000–5,000 pairs. (Other western Asiatic birds

winter in southern Arabia, where some also breed, and from southern Iran across to India.) Though we have no data on numbers in Pakistan and India, species is widespread and locally common there and must be represented by many thousands of resident pairs. Even so, it may well be that the total world population is now less than six figures, whereas it was once well over.

**GEOGRAPHICAL VARIATION** Two races, differing in size and bill colour.

*N. p. pennopterus* (whole Eurasian and African range, except peninsular India and Nepal) Slightly larger; adult bill strongly tipped black or blackish-brown.

*N. p. ginginianus* (most of India, except northwest, and Nepal) All measurements typically smaller; adult bill entirely yellow.

Distinction obscured in Pakistan and Himachal Pradesh, where size intermediate and adult bill variably brown-tipped; African birds possibly also average slightly smaller than European.

**MEASUREMENTS** *N. p. pennopterus* ♂ wing 470–536 mm, ♀ 460–545 mm; ♂ tail 220–251 mm, ♀ 240–267 mm; ♂♀ tarsus 75–87 mm. *N. p. ginginianus* ♂ wing 393–490 mm, ♀ 455–505 mm; ♂♀ tail 228–251 mm, tarsus 75–85 mm (upper ends of these ranges probably include figures from Pakistan and northwest India). **Weights** *N. p. pennopterus* ♂♀ 1.6–2.4 kg; Israel averages ♂ 1.8 kg (five), ♀ 2.1 kg (five).

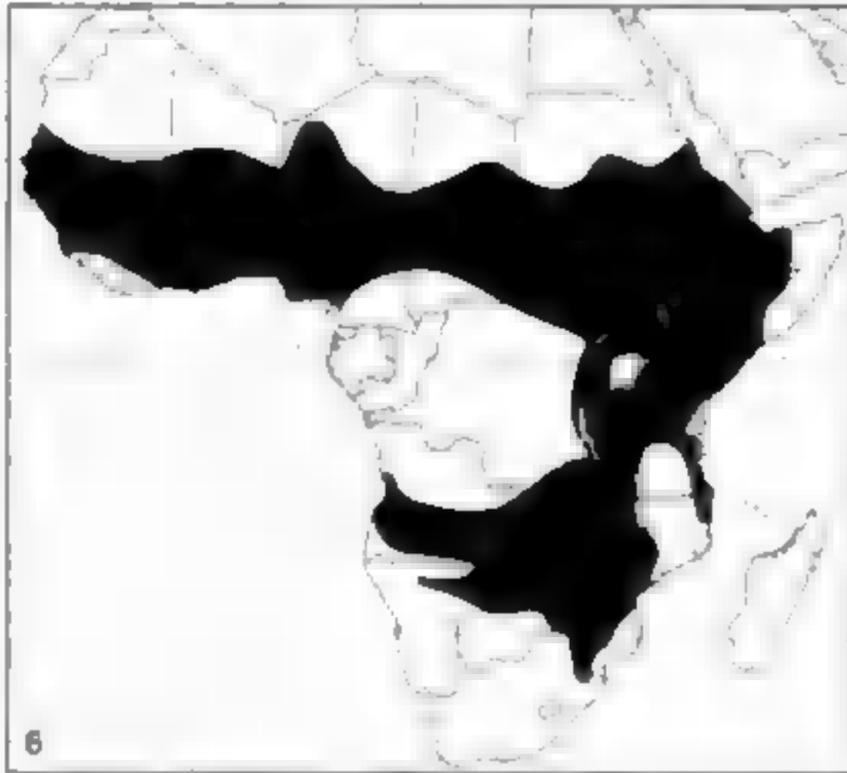
**REFERENCES** Alcock (1970), Ali & Ripley (1978), Baumgart (1991), Beaman & Madge (1998), Bergier & Cheylan (1980), Bernis (1975, 1980), Bijlsma (1983), Bologna (1977), Boswall (1977), Brooke (1979), Brown & Urban (1960), Brown *et al.* (1982), Bundy (1976), Carlon (1998), Ceballos & Donazar (1989a/b, 1990a/b), Cheylan (1978, 1979, 1980), Clark & Schmitt (1999), Cortone & Liberatore (1989), Cramp & Simmons (1980), Donazar & Ceballos (1989, 1990), Elósegui (1989), Etchécopar & Huc (1964, 1967), Fischer (1974), Forsman (1990), Frumkin (1986), Galushin (1971), Génsbol (1986, 1995), Giraudoux *et al.* (1988), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Grimmett *et al.* (1998), Guban (1989), Hagemeljer & Blair (1997), Handrinos (1985), Handrinos & Akrotis (1997), Handrinos & Demetropoulos (1983), Houston (1975, 1983), Janossy (1989), Kemp & Kemp (1998), Krusk (1967), Levy (1989, 1991), Levy & Mendelsohn (1989), Moreau (1972), Mundy (1978), Mundy *et al.* (1992), North (1947), Pennycuik (1972), Perennou *et al.* (1987), Pickford *et al.* (1989), Richardson (1990), Riddell (1945), Roberts (1991), Serfontein (1961), Shirihai (1996), Shirihai & Christie (1992), Steyn (1982), Stresemann (1944), Svensson *et al.* (1999), Tella (1993), Terrasse (1985), Terrasse *et al.* (1961), Terrasse & Thauront (1988), Terrasse (1983), Thaler *et al.* (1986), Thiollay (1967a, 1977a, 1978c, 1985d, 1989c), Thomsen & Jacobsen (1979), Thouless *et al.* (1989), Tucker & Heath (1995), van Lawick-Goodall (1968), van Lawick-Goodall & van Lawick-Goodall (1966), Welch & Welch (1988), Whistler (1941), Wilbur (1985), Wilbur & Jackson (1983).

## 55 HOODED VULTURE

*Necrosyrtes monachus* (Temminck, 1823)

Plate 19

**DISTRIBUTION** Afrotropical (19°N to 26°S); order 6; generally scarce or even rare south of equator, but common or locally abundant to north. Sub-Saharan Africa: Senegal and south Mauritania through southern Niger and Chad to southern Sudan, Ethiopia and west Somalia southwards, except in unbroken forest, to northern Namibia and Botswana, and through Zimbabwe to south Mozambique and northeastern South Africa.



**MOVEMENTS** Sedentary, but immatures and other non-breeders somewhat dispersive. Regional movements in some parts of West African Sahel in response to rains, the species being more numerous in the dry season. Wanderers reach northern Mauritania and Niger, and two vagrants recorded Morocco. In southern Africa, one adult and one immature travelled 210 km and 150 km within eight and five days, and individuals sporadically recorded south of main range.

**HABITAT** Very varied, often commensal with human beings, in main western and northern range; much shyer and more restricted in south. Where commonest, in West Africa eastwards to Ethiopia and Uganda, abundantly associated with human settlements from large towns to forest villages, scavenging at abattoirs, market places and rubbish dumps, but also numerous in both open grassland and wooded savannah, and occurring in desert and scavenging on coastal flats. In Kenya and Tanzania, widespread and locally common in either open or well-wooded country and forest edge, waiting for scraps near cattle-pens and small villages, but not concentrating in built-up areas. In southern Africa, essentially in open savannah and avoiding even rural settlements. Sea-level to 4,000 m, but most numerous below 1,800 m.

**FIELD CHARACTERS** Small, scruffy-looking, mostly brown vulture with thin bill, bare crown, face and foreneck, conspicuous ear-holes, and downy nape and hindneck, untidy ruff. Perches hunched with drooped wings, often inside tree canopy (unlike larger vultures); wings cover short, slightly rounded tail; walks and runs quite easily. Sexes similar, and female barely averages larger; juvenile distinguishable.

**PERCHED Adult** Mainly dark brown with blacker flight-feathers and tail, blackish ruff, whitish patches showing through at sides of creamy-buff crop and on thighs, and pale silver-buff down on hindneck shading to white at sides; bare pink face and foreneck brighter when breeding, and bluish purplish-red in sexual excitement or while establishing dominance at food. **Juvenile** Rather similar, but scaled buff above, little or no white showing at sides of dark crop or on thighs, blackish neck-down extending forwards over crown; bare face and foreneck grey-white (at most faintly tinged pink) and face covered with black bristles. **Immature** Juvenile moults slowly at 6–18 months, then followed by immature stages that gradually become more like adult over several years as crown becomes bare, hindneck and sides of crop paler. **Bare parts** Eyes dark brown to blue-black. Cere pinkish-white. Adult bare face and throat pink, flushing red, juvenile whitish. Adult feet pale blue-grey to pinkish-blue or greenish-white, juvenile brownish, changing to adult colour towards end of first year.

**FLIGHT** Medium-sized raptor, long, broad, round-tipped wings, six fingers, short rounded tail (may become squared or slightly wedged through wear), thin bill, and more or less bare head extending forward from ruff; wingspan 2.5 times total length. On wing much earlier than large vultures. Takes off easily from ground with fast beats; soars on flat wings, more bowed in glide. **All plumages** At distance can look uniformly brown in flight, but usually lighter head and legs, and slightly paler mid-wing behind dark linings; adult's pink head and whitish-marked crop area and thighs often conspicuous.

**CONFUSION SPECIES** Adult distinctive when settled, on combination of size, thin bill and pink head; but in flight high overhead, when distance wrongly estimated, could be mistaken for actually far bigger Lappet-faced Vulture [64] because of pink head, white around crop area and white on thighs, though Lappet-faced has all-white thighs, streaky underbody and more prominent pale central wing-bar. On same principle of misjudged size of comparable shape high overhead, juvenile easy to confuse with all-dark juvenile Lappet-faced unless noticeably slim head and bill can be seen. Juveniles of most other African vultures have pale bars or other distinctive contrast on wing-linings; only exceptions are Palmnut [52] (largely feathered head and heavy bill, different wing shape with short hands) and Egyptian [54] (greyish face, long-feathered ruff on nape and hindneck, pale rump, longer and greyer wedge-shaped tail, longer thinner wings with only five fingers, flight-feathers tinged greyish above and darker than linings below). Hooded and Palmnut Vultures occur together and will roost alongside in trees.

**VOICE** Almost always silent. Thin squealing and chittering at food and nest.

**FOOD** Carrion, also insects. Wide range of smaller carrion, especially urban offal, scraps of meat, skin and bone, small roadkills, and remains of larger carcasses already eaten by other scavengers; also human and other mammal faeces, dead and stranded fish, and variety of

insects (locusts, alate termites, caterpillars and other larvae). Starts foraging much earlier in day than larger vultures. Where some form of food in regular supply (abattoirs, dumps, markets, small zoos), waits in adjacent trees and often carries off food in bill; holds down scraps with one or both feet and pulls off pieces. Attends active cultivation and follows ploughs in search of disturbed invertebrates. Often among first arrivals at larger carcasses, but soon displaced and, later, uses thin bill to extract scraps that larger scavengers have failed to reach. Being a scrap-eater, rather than head-inserter, does not usually become much soiled.

**SOCIOSEXUAL BEHAVIOUR** South of equator mainly solitary or, at most, small parties and rather shy, but highly gregarious in West and northeast tropical Africa south to Uganda, gathering in hundreds at abattoirs and other abundant food sources, particularly in towns, also roosting together in numbers in trees and even nesting semi-socially. (The distributions of the two behavioural groups coincide roughly, but not exactly, with those of the two subspecies: see Geographical Variation). Aerial displays mainly involve pair-members soaring together silently, only rarely diving, rolling or foot-presenting.

**BREEDING** In West Africa and Kenya throughout year (especially November–July), in northeast Africa mainly October–June, and in southern Africa May–December. Rather small nest of sticks, 50–100 cm across and 20–75 cm deep, lined with green leaves, grass, hair, skin and rags, in subcanopy fork of tall acacia, palm, ebony (South Africa) or other tree, rarely on top of crown (unlike most other tree-nesting vultures) and rarely, too, on cliff or building. Clutch 1. Incubation 46–54 days. Fledging 80–130 days; dependence for further 3–4 months.

**POPULATION** In West Africa, may occur in concentrations of several hundreds, one study in Nigeria located 279 nests in 40 km<sup>2</sup>. Also many non-breeders where

common. Total numbers guessed at between 200,000 and 330,000 in early 1990s (Mundy *et al.*). Populations mostly stable, apart from local and seasonal increases and decreases. Important as urban scavenger in West Africa, and symbiotic relationship with people and their rubbish ensures successful future in many areas north of equator, but species has apparently seriously declined in Sudan, Somalia and elsewhere, perhaps originally through poisoning and, more recently, target practice.

**GEOGRAPHICAL VARIATION** Two races usually recognised, indicating marked clinal size increase from west towards east and south.

*N. m. monachus* (West Africa east to west Sudan and north Uganda) As above.

*N. m. pileatus* (East Sudan and Ethiopia south through East Africa to Angola and South Africa) Very similar in appearance, but slightly larger, with longer wings and, on average, longer tail and tarsi, thinner bill; except in north, generally much less gregarious or associated with people, more restricted in habitat and feeding behaviour.

**MEASUREMENTS** *N. m. monachus* ♂ wing 468–485 mm, ♀ 473–493 mm; ♂ tail 214–224 mm, ♀ 212–230 mm; ♂ tarsus 79–82 mm, ♀ 78–86 mm. *N. m. pileatus* ♂ wing 508–530 mm, ♀ 508–540 mm; 'East African' specimens quoted as low as 460 mm perhaps belong with *monachus*. **Weights** 1.5–2.6 kg.

**REFERENCES** Bannerman (1953), Benson & Benson (1975), Britton (1980), Brown *et al.* (1982), Cramp & Simmons (1980), Fraser (1980), Ginn *et al.* (1989), Gore (1990), Grimes (1987), Houston (1989), Howells (1978), Huxley & Howells (1988a), Kemp & Kemp (1998), Kruok (1967), Mackworth-Praed & Grant (1957–73), Maclean (1993), Mundy (1972, 1975), Mundy & Cook (1972, 1975), Mundy *et al.* (1992), Pickford *et al.* (1989), Pinto (1983), Serle (1943), Snow (1978), Steyn (1982), Tarboton & Allan (1984), Thiollay (1978c, 1985d), Wilson (1982).

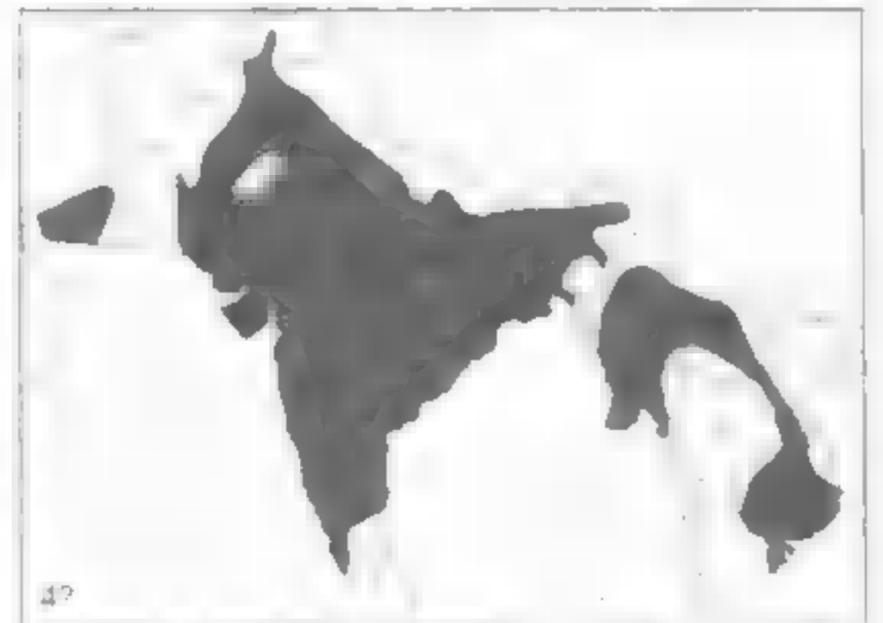
## 56 WHITE-RUMPED VULTURE *Gyps bengalensis* (Gmelin, 1788)

Plate 21

Other names: Oriental, Indian or Asian White-backed Vulture

**DISTRIBUTION** Indomalayan (c33°N to c9°N); order formerly 7, recently 6, now 4<sup>2</sup>; greatly decreased in various countries during 20th century and, as result, extinct regionally in much of east and extreme west of earlier distribution, but until recently still common or even abundant in main central range before catastrophic population crash from 1996 or 1997, accelerating into 2000. Indian subcontinent, and adjacent countries, to southeast Asia; at least formerly, southeast Iran (east from Hormuz, present status unknown) and Afghanistan (decreased, now perhaps irregular or extinct); currently, Pakistan (long decline in west, now marked decrease everywhere), India (wide distribution north to lower Himalayas and south to Kerala and Nilgiri Hills, long decreasing in south, now massive population crash and local extinctions in various areas), Bangladesh (recently still common, but likely to be similarly affected) and

lower altitudes of Nepal (simultaneous major decline) and of Bhutan (present position uncertain); also, further east, but well before the current crash, Burma (long decreased), southeast China (south Yunnan only, rare),



Thailand (once common, now virtually extinct), northern peninsular Malaysia (probably extinct), and parts of Laos, Cambodia and south Vietnam (once common, now mostly rare).

**MOVEMENTS** Basically sedentary, but forages over large areas and immatures more nomadic; in Nepal descends from higher habitats in winter. Former summer visitor to Afghanistan. In Thailand now more likely to be seen as 'occasional winter visitor' than, as in 1991, 'very rare resident...almost extinct'. One old vagrant record for Borneo (Brunei).

**HABITAT** Vicinity of villages and older towns and cities with open areas and tall trees near slaughterhouses and rubbish dumps; riverside trees in farmland, open country or scrub jungle; also forest edge, wooded savannah, semi-desert; mainly in lowlands and foothills. Sea-level to 2,700 m, mostly below 1,200 m; some March-May reports in Nepal as high as 3,000 m+.

**FIELD CHARACTERS** Medium-sized and fairly bulky vulture, black-brown and only from fourth year white-rumped, with short stout bill, small and sparsely downy head and neck, smallish downy or leathery ruff, long wings, short tail. Often rather tame. Perches openly, hunched on trees and buildings, but on ground usually more upright with head higher; regularly bathes and wing-dries; rolling walk and bounding hops and runs; wing-tips cover tail. Sexes similar, and female averages only 1-2% larger; juvenile distinct but probably remains much the same until third year, after which white rump begins to appear; may breed in subadult plumage.

**PERCHED Adult** Mainly blackish-slate above, with oily-looking gloss on upperbody, wing-coverts and primaries, contrasting greyer secondaries, white or dirty cream and downy ruff, and white lower back and tail-coverts (hidden at rest); dark grey skin of head and neck patchily covered with buff down, thickest on crown and nape; below, white ruff broken in front by blackish crop-patch, black breast and abdomen with thin white shaft-streaks, white conspicuous on inner thighs in front view. **Juvenile** All dark brown above (including rump) with brownish-buff streaks, uniformly darker tail and blacker primaries, and cinnamon-buff ruff of more pointed leathers; paler grey skin of head and neck more completely covered by whitish-buff down; below, warmer reddish-brown more broadly streaked with creamy-buff; crop-patch browner, inner thighs creamier. **Second/third-year** Probably much like juvenile, but down on head becomes more buff, less cream, and ruff shorter and downier. **Fourth-year onwards** Brown of body and upperwing-coverts increasingly mixed with black; white rump starts to appear; head and neck bare, with buff down. **Bare parts** Adult eyes pale brown to yellow-brown, juvenile dark brown. Cere black, adult shinier. Bill also dark, but adult and fourth-year onwards have contrasting whitish culmen behind slaty tip. Head skin of adult dark grey, juvenile paler. Legs greenish-slate to blackish.

**FLIGHT** Large raptor with small head protrusion, bulging secondaries and seven fingers on long broad wings, and very short rounded tail (can look squared or even wedge-shaped with wear); wingspan 2.5 times total length, tail less than two-thirds length of wing-base (but over two-thirds on juvenile). Takes off from tree with few deep laboured beats, but on ground often needs to

run and hop for some distance with necessarily shallower flaps; glides with wings level but backswept hands bowed at carpal joints, at speeds of 80-90 km/h; soars with wings slightly raised in shallow V. **Adult** Mainly dark above, almost shiny on mantle, upper back and wing-coverts, but greyer secondaries and bases to primaries, paler head, relatively inconspicuous white ruff (often soiled) and bold white rump-patch; below, white wing-linings, emphasised by thin black leading edges (widest at carpals), stand out from blackish-tipped silvery flight-feathers and dusky body and tail; whitish ends of ruff (at sides of black crop) and pale streaks on body show only at closer ranges, and white on inner thighs hidden. **Juvenile** Appears all dark grey-brown above (no white rump) with creamier-looking head, though flight-feathers (especially wing-tips) and tail actually blacker than rest; only slightly more contrast below between dark quills and buff-streaked warmer brown body and wing-linings (white probably does not start to appear on underwing-coverts until fourth year), but white at sides of dark crop-patch extends into thin white or cream bar (and sometimes traces of second bar) near leading edge of each wing. **Immature** See previous paragraph; head becomes darker with loss of down, and white on wing-linings first appears as additional bars on greater and median coverts.

**CONFUSION SPECIES** Adult unmistakable, both perched and in flight (black-plumaged Red-headed Vulture [66] can show whitish patch on lower back, but different wing shape and underwing pattern, as well as distinctive white or whitish patches on thighs and, when younger, crissum). Juvenile and immature stages, particularly in worn plumage with faded feathers, may need more care in distinction from corresponding ages of Long-billed [58] (paler, more two-toned plumage, sandy wing-linings, shorter but visibly slenderer bill starting dark with yellowish culmen in juvenile and becoming all-yellowish in adult, straighter trailing wing-edges in flight) and, in northwest of range, Griffon Vulture [61] (larger, again paler with more contrast above and below between lighter body and wing-coverts, both also more thinly streaked, and darker flight-feathers; bars on wing-linings may be roughly comparable to fourth-year White-rumped, but latter by then would be showing partial white rump). See also Himalayan Vulture [60].

**VOICE** Croaks, grunts, hisses and squeals at nests, roosts and carcasses. Rancous strident creaky screeches or 'laughter' - *kakakaka* - when one supplants another at carcass or roost; 'long-drawn grating noises, as if of a hoe being scraped over a cement floor, uttered by female during copulation'.

**FOOD** Carrion and offal, both putrid and fresh, of cattle, other mostly domesticated mammals, and human corpses. Forages by soaring singly and watching activities of ground predators, crows, kites and other social vultures. Will roost on ground by carcass, even feed by moonlight.

**SOCIOSEXUAL BEHAVIOUR** Gregarious, usually in small groups, often with Long-billed [58] and other vultures, but sometimes in larger flocks of up to 100+. Regular communal tree-roosts. Aerial courtship involves mutual circling, wing to wing; no acrobatics recorded.

**BREEDING** Solitary or, more usually, colonial. In India November–May (end October–July), most laying November–early January. Fairly large nest, 60–80 cm across and 15–20 cm deep, of leafy sticks, lined with wool, skin, dung and rubbish, at 5–30 m (mostly c10–18 m) in tall tree by road or river, or in village or town, or at forest edge; often 2–3 nests (up to 15 recorded) in one tree, several in adjacent trees, or up to 40 loosely scattered along avenue or riverine gallery or in copse. Clutch 1. Incubation 45–52 days. Fledging c3 months.

**POPULATION** Once common over nearly 6 million km<sup>2</sup>, population presumably ran into millions: old Delhi alone held c400 pairs of vultures (mainly this species) at average 2.7 pairs/km<sup>2</sup> in 1967–69; and breeding densities nearly five times higher were recorded 180 km to the south near Bharatpur, in Rajasthan, in the late 1980s (see below). East of the Indian region, however, this species largely disappeared from Burma and south-east Asia by the 1970s: once common in Thailand, for example, it was almost extinct before the 1990s, and it became very rare in Malaysia, Laos, Cambodia and south Vietnam through a variety of possible causes including widespread deforestation, replacement of open savannah with ricefields, dead cattle and other stock used for human consumption, less firmly rooted benevolence towards vultures and, in the former Indochina area, the habitat destruction, disturbance and persecution resulting from civil and international wars. On the other hand, vulture populations remained high in India because of the primitive methods of carcass and slaughterhouse waste disposal and, even though the White-rumped had declined in the northwest and south, it was still regarded as common through much of that huge country as recently as 1997, with carrion plentiful and vultures traditionally welcomed, and it was the commonest vulture in Nepal up to 1,000 m and to 1,370 m in the Kathmandu Valley. Then a catastrophic decline began about 1996. At first, what was happening was realised in only a few places, notably by Pradesh (1999), in the Keoladeo National Park, Bharatpur, an area of thorn-bush typical of much of western India and surrounded by village crops and cattle. There the resident breeding population dropped from 353 nests (12.2 nests/km<sup>2</sup>) in 1987/88 to 150 in 1996/7, and then crashed to only 25 nests in 1997/8 and just 20 (0.68 nest/km<sup>2</sup>) in 1998/9, a decrease of 95% with no eggs laid in 60% of the nests in the last season and total failure of breeding success in the last two. Over that period, the population of vultures in the Park similarly dropped by 96% from a peak of c1,800 (62 birds/km<sup>2</sup>) in 1985/86 to 86 (3 birds/km<sup>2</sup>) in 1998/99. Moreover, in 1985/86 all carcasses seen in the Park had an average of 80 vultures at them, whereas in November–May 1998/99 92% of c100 carcasses sighted had no vultures and the remaining 8% an average of only 19; in each season, roughly two-thirds of these vultures were White-rumped and one-third Long-billed [58] (which also see). Some White-rumped Vultures perched on trees for an average of 32 days or more, repeatedly dozing until the beak hit the branch and then waking with a start, until they finally fell down and died within minutes. By mid 2000 both White-rumped and Long-billed 'were found dead and dying in Nepal, Pakistan and throughout India, and

major declines and local extirpations were being reported' (BirdLife International): possible causes of this crash suggested by Pradesh include a viral disease (though vultures have an unusual resistance to infections), widespread use of organochlorine pesticides including several now banned in North America and Europe (but vultures feed mainly on large mammals which are less prone to build up high levels), poisoning of carcasses against mammal predators (more likely, but no evidence of that around Keoladeo), and low levels of genetic variability (as affected Cape Vultures [62] in South Africa); he also dismissed reduction in food supply because methods of carcass disposal had remained unchanged around the Park. Remarkably, too, it seems that the population crash may be specific to the genus *Gyps*: the only other vultures that are certainly affected are the two forms of the Long-billed [58] (which see), while both the Himalayan [60] and the Indian race of the Griffon [61] have disappeared from Keoladeo where they were regular, if uncommon, winter migrants from the mountains: in contrast, the populations of other Indian vultures appear to be stable or declining much less. There is still traditional benevolence towards vultures, though big regular roosts can cause friction by killing trees 'in coconut groves, mango orchards, forest plantations'. Following the crash, the total world population of this once abundant vulture is now put by BirdLife International in the range 2,500–10,000 birds, and classed as 'critical'. In view of the normal low reproduction rate of vultures, the combination of high adult mortality and total breeding failure are a recipe for extinction. Even a slight increase in mortality leads to rapid decline (Houston).

**GEOGRAPHICAL VARIATION** Monotypic. Once treated as conspecific with White-backed Vulture [57] of Africa, but these two now generally regarded as forming a superspecies, which sometimes placed in separate genus *Pseudogyps* (differing from typical *Gyps* in 12, not 14, tail-feathers, white back and tree-nesting).

**MEASUREMENTS** ♂ wing 535–608 mm, tail 217–238 mm, tarsus 94–124(?) mm. **Weights** ♂♀ 3.5–5.7 kg (29).

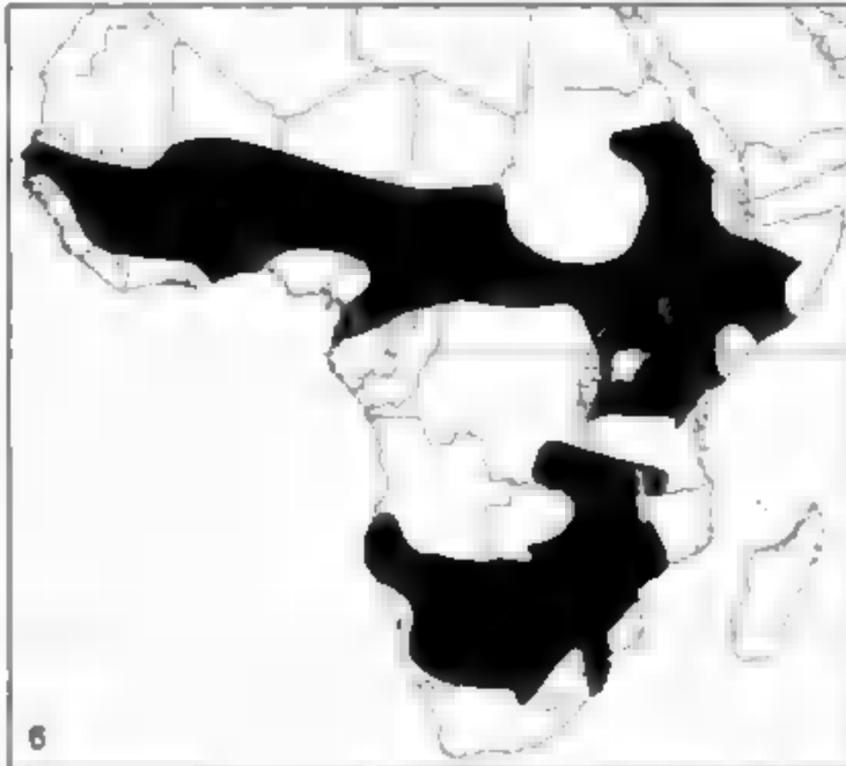
**REFERENCES** Ali & Ripley (1978), BirdLife International (2000), Deignan (1945, 1963), Delacour & Jabouille (1931), Duckworth *et al.* (1999), Cheng Tso-hsin (1987), Etchécopar & Hùc (1970), Galushin (1971), Goes (1999), Grimmett *et al.* (1998), Grubb (1980, 1989), Hollom *et al.* (1988), Holmes & Wells (1975), Houston (1987), Hùc & Etchécopar (1970), Humphrey & Bain (1990), Inskipp & Inskipp (1991), King *et al.* (1975), Lekagul & Round (1991), Mackinnon & Phillipps (1993), Medway & Wells (1976), Meyer de Schauensee (1934), Prakash (1999), Proud (1949), Roberts (1991), Robertson & Jackson (1992), Round (1988), Satheesan (1989d/e), Smythies (1981, 1986), Wells (1999).

## 57 WHITE-BACKED VULTURE *Gyps africanus* Salvadori, 1865

Plate 22

Other names: African Whitebacked Vulture or Griffon

**DISTRIBUTION** Afrotropical (22°N to 29°S); order 6; generally common to abundant. Much of sub-Saharan Africa: Senegambia, southernmost Mauritania, south Mali and northern parts of Gulf of Guinea countries, east through Nigeria, northern Cameroon and Central African Republic, and southern Chad and Sudan, to Ethiopia and western Somalia, and then southwards through East Africa and Mozambique, Malawi and Zambia to Zimbabwe, northeastern South Africa, Botswana and inland Namibia, thence north into southern Angola.



**MOVEMENTS** Generally regarded as sedentary, but immatures more nomadic and even adults cover great distances in daily foraging. Some population shifts also related to locally abundant food supplies, migrations of ungulates (e.g. East Africa), and onset of rains (e.g. moving north from wooded areas of West Africa during April–September). In South Africa, three ringed adults moved 67–362 km and eight immatures 117–980 km.

**HABITAT** Open and wooded country from grassy plains, savannah and open swamps to light woodland, riverine trees and thornbush, but not dense woodland or forest. Always roosts in trees. Commonest where large wild mammals numerous. Associated with cattle-ranches and nomadic herders, but not towns and villages. Mostly sea-level to 1,500 m, but to 3,000 m in Kenya and even 3,500 m in Ethiopia.

**FIELD CHARACTERS** Medium-sized vulture, largely brownish to creamy as adult, with longish and fairly powerful bill, bare-looking head and neck and neat or straggly ruff. Walks and runs with lolling gait; long wings cover short tail. Sexes similar in both plumage and size (female usually, male sometimes, averages fractionally smaller); juvenile distinguishable; as adult after six to seven years.

**PERCHED Adult** Mainly pale yellow-brown to buff (old birds, perhaps especially males, creamy-white) with blackish-brown flight-feathers and tail, neat white downy ruff, and white lower back and rump (normally concealed by folded wings); black skin of head and neck

more or less covered (least on face and foreneck) with short, sparse whitish or cream down (like ruff, often grey with dust or, until post-prandial bathe, soiled with blood); blackish-brown eyes and blackish legs; two small bare spots at basal neck-sides brown and usually hidden (cf. Confusion Species). **Juvenile** Much darker brown with straggly brown ruff, all thinly white-streaked, including brown rump; greenish-black skin of head and neck more densely covered with white down, except on face. **Immature** Juvenile starts moulting at 10–12 months, and thereafter continuously with mixed age-plumages until six to seven years. Little change during second and third years, except that thicker down on head and neck gradually lost (exposing patches of blackish skin), brown plumage becomes paler and white streaks disappear; in fourth year brown ruff replaced by white, and some white begins to appear on lower back, but white patch not complete until sixth or seventh year. (May breed with only partially white rump.) **Bare parts** Eyes blackish-brown. Cere grey. Feet blackish. Bare crop-patch and neck-spots dark brown.

**FLIGHT** Large raptor with long broad wings with bulging secondaries, short rounded tail (may become squared or wedged through wear), bare-looking head and neck with basal ruff; wingspan 2.5 times total length. Take-off laboured, particularly if gorged; slow beats; glides on flat wings, hands dropped and angled back; soars with slight dihedral. Flies at 58–65 km/h, downward glide up to 120 km/h. **Adult** Pale brown to cream with blackish flight-feathers and tail, and white ruff; above, obvious white rump; below, contrasting whitish wing-linings. **Juvenile** Darker streaky brown with barely paler rump, inconspicuous dark ruff, whiter head; wing-linings as underbody but for thin whitish bar near leading edge. **Immature** Becomes paler, but otherwise little change until fourth year, when rump and wing-linings begin to whiten.

**CONFUSION SPECIES** Confusion likely only with three congeners: Cape Vulture [62] in southern Africa; Rüppell's [59] in West, north-central and East Africa; and, very marginally, Griffon [61] in northern Sudan and Ethiopia and, to west, in Mali, Mauritania and Senegal, where mainly vagrant. Cape Vulture larger, with heavier bill and longer, thicker, barer neck; adult has yellow eyes, blue basal neck-spots (sometimes conspicuous), whiter plumage, no contrasting white rump and, in flight, below, larger area of white on wing-linings, blackish spots along greater coverts, and two-tone secondaries; juvenile paler and more obviously streaked, with red lower neck and basal neck-spots and, in flight, underwings much as underbody. Rüppell's also larger, with heavier bill, longer and snakier neck; adult unmistakable; juvenile paler and streakier, but otherwise rather similar to White-backed (though with yellow-brown eyes, pinkish-blue basal neck-spots, brown bill, grey legs) and most easily identified in flight by darker wing-linings with three to four pale lines behind anterior bar. Griffon larger still, with relatively longer wings and shorter neck and tail, again yellowish eyes, blue basal neck-spots; paler and more rufous in all plumages, with darker-centred

(adult) or all-dark (juvenile) greater wing-coverts above and below, underwings otherwise uniform with body and strongly contrasting with flight-feathers and tail.

**VOICE** Usually silent. Chittering and pig-like squealing during squabbles at carcass; dominant birds hiss. Hoarse cackles at nest.

**FOOD** Carrion: intestines and softer flesh of mainly large dead mammals. Rises in thermals two to three hours after dawn and forages mainly at 200–500 m above ground, always watching other bird and mammal scavengers and predators. Hooded Vultures [55] and, especially, immature Bateleurs [73], often first at carcasses and attract numbers of White-backed together with Rüppell's [59] in northern tropics or, in southern Africa, Cape Vultures [62]. White-backed usually commonest and tens, even hundreds, may gather at single carcass (impala *Aepyceros melampus* often eaten within ten minutes). Full crop may contain up to 1 kg of meat. Cannot tear thick skin, but long bill and neck and narrow head adapted to deep and bloody penetration of any orifices and wounds.

**SOCIOSEXUAL BEHAVIOUR** Solitary to highly gregarious; some pairs breed singly, but more often in loose colonies of 5–20 pairs in nearby trees, occasionally even half-dozen nests in one tree; usually roosts communally and large concentrations may gather at carcasses. Aerial displays no more than slow circling over nesting area, either singly or pair together or whole subcolony of ten or dozen birds, sometimes with outstretched necks and lowered legs.

**BREEDING** Solitary to colonial. In Uganda and Kenya, eggs or young in one colony or another all year; from

West Africa to Somalia, in much of year but particularly October–June; in southern East and southern Africa, especially April–May–December/January. Relatively small nest of sticks, 34–100 cm across and 10–90 cm deep, lined with grass and green leaves, at 5–50 m on crown of tall tree (less often in exposed upper fork), rarely on pylon, never on cliff. Clutch 1 (1–3). Incubation 36–58 days. Fledging 120–130 days.

**POPULATION** Most numerous vulture of sub-Saharan Africa, except in more populated parts and in Guinea and DR Congo forest regions. Estimated 2,500 breeding pairs in former Transvaal alone; and total population put at about 270,000 in early 1990s (Mundy *et al.*). Threatened in some areas by poisoned carcasses; has declined in South Africa, despite some expansion through adoption of pylon nesting sites, and decreasing at least in the northeast, from Sudan to Somalia.

**GEOGRAPHICAL VARIATION** Monotypic. Forms a superspecies with White-rumped Vulture [56] of India and southeast Asia (which see).

**MEASUREMENTS** ♂ wing 550–640 mm, tail 240–275 mm, tarsus 86–118 mm. **Weights** 4.2–7.2 kg, mean 5.5 kg.

**REFERENCES** Allan (1988b), Bannerman (1953), Benson & Benson (1975), Brown *et al.* (1982), Dowsett & Dowsett-Lemaire (1980), Gann *et al.* (1989), Gore (1990), Grimes (1987), Houston (1974a/b, 1975, 1976, 1989, 1993), Howells & Hustler (1984), Kemp & Kemp (1975b, 1998), Krauk (1967), Mackworth-Praed & Grant (1957–73), Maclean (1993), Mundy & Cook (1972, 1973), Mundy *et al.* (1992), North (1944), Pennycuik (1971a, 1972), Pickford *et al.* (1989), Pinto (1983), Tarboton & Allan (1984), Thiollay (1978b/c), Steyn (1982).

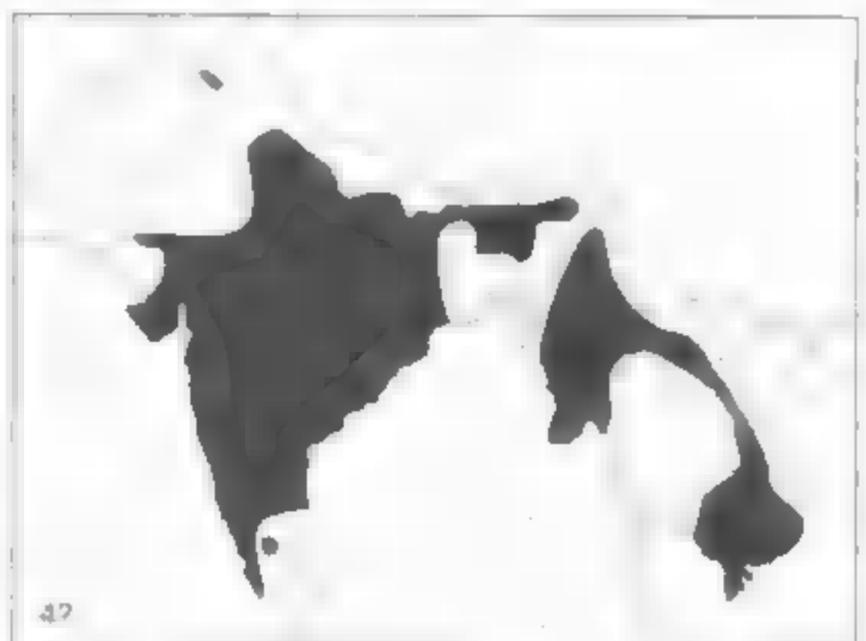
## 58 LONG-BILLED VULTURE *Gyps indicus* (Scopoli, 1786)

Plate 21

Other names: Indian Griffon or Vulture, Long-billed Griffon

**DISTRIBUTION** Indomalayan (c33°N to c10°N); order formerly 5–6, now 4; greatly decreased in various countries during 20th century and, as result, extinct in most of eastern half of earlier range, but until recently still fairly common to locally common in western half until catastrophic population crash that seems to have begun about 1996, reaching peak in mid 2000. Indian subcontinent to southeast Asia: southeast Pakistan (formerly also northeast, now marked decrease), Kashmir and much of India (from lower Himalayas southwards, except southernmost peninsula, now population crash and local extinctions), north and central Bangladesh (uncommon to locally common, but likely to be similarly affected), and lower altitudes of Nepal (comparable decline) and of Bhutan (present position uncertain); also farther east, but well before current crash, Burma (long decreased), Thailand and peninsular Malaysia (long rare, now thought to be extinct), Laos and Cambodia (once fairly common, but now rare and local but some recent records) and south Vietnam (once fairly common, but now probably extinct). Assessing former status is more difficult for this

vulture, which is traditionally overlooked among immatures of White-rumped [56] and which has two rather different races that may be distinct species (see Geographical Variation).



**MOVEMENTS** Sedentary, but forages over large areas, and immatures probably more nomadic; some seasonal altitudinal movement in Nepal.

**HABITAT** Similar to White-rumped [56], which it often accompanies, but less in urban and wooded areas, more in savannah and plains, open country with crags, farmland with trees, and vicinity of villages. Sea-level to 2,000 m, mostly below 900 m.

**FIELD CHARACTERS** Medium-sized to largish and fairly bulky vulture, paler body and coverts contrasting with darker quills, with relatively thin (rather than long) bill, relatively small and sparsely downy or quite bald head and neck (different races: see Geographical Variation), smallish downy or leathery ruff, long wings, short tail. Shape and behaviour on perch and ground very like White-rumped [56]. Sexes similar, and female averages only 1–2% larger; juvenile separable, but increasingly like adult after third year.

**PERCHED Adult** Mainly pale buff or brownish-buff above with lighter edges, but contrasting darker greater coverts, blackish tail and primaries, and browner secondaries; brownish-grey to blackish-grey skin of head and neck either sparsely and patchily covered with brownish-white to dirty greyish down (peninsular India) or almost completely bare (elsewhere); white or dirty cream and downy ruff broken in front by brown crop and, as on other true griffons, circular patches at each side of that, which may be grey to pink; underbody sandy-brown with thin dark shaft-streaks, thighs and crissum generally paler. **Juvenile** Browner upperbody and shoulders with rufous-buff edges and shaft-streaks, but these areas still paler than greater coverts (only light-tipped) and blackish-brown quills; longer brown leathery ruff; head and neck either more completely covered by whitish-buff down or nearly bare; light brown below, broadly streaked with creamy-buff, palest on lower belly, thighs and crissum; crop-patch paler brown than adult. **Second/third-year** Probably much like juvenile, but decreasing down on head, and ruff shorter and downier. **Fourth-year onwards** Becoming more uniformly pale and contrasting, increasingly like adult. **Bare parts** Eyes brown or dark brown. Adult cere and bill dull greenish-grey to pinkish-yellow, juvenile blackish with yellower culmen. Head skin brownish-grey to blackish-grey. Legs blackish-slate.

**FLIGHT** Large raptor with small head protrusion, seven fingers on long and rather evenly broad wings (secondaries not particularly bulging), and very short rounded tail (can look squared or wedge-shaped with wear); wingspan 2.5 times total length, tail under two-thirds length of wing-base (probably over on juvenile). Flight as White-rumped Vulture [56], but 'glides on more level wings... sometimes bowed'. **Adult** Above and below, contrast between pale body and lesser and median wing-coverts (all light buff to sandy-brown) and dark tail and flight-feathers (mostly blackish, but secondaries clearly browner), while greater coverts brown-centred (much more conspicuously above, little more than dots below); white to dirty cream ruff often not especially conspicuous (least of all when dirty), but emphasises dark greyish head (particularly in bare-headed northern and eastern race) and browner crop. **Juvenile** Above, streaky brown body and forewings clearly darker than adult, but still contrast with blacker-brown greater coverts and quills, though ruff does not show up at all; upperhead appears whiter (peninsular India) or dusky (elsewhere); more contrast below and, though body streakier and wing-linings whiter, resembles adult at distance except

for paler head (if at all downy), straggly brownish ruff, paler brown crop-patch, and darker and streakier leading edges (lesser coverts) and mid-wing diagonals (outer greater coverts and usually primary coverts). **Immatures** See previous paragraph: ages may be very difficult to distinguish in flight when seen from below.

**CONFUSION SPECIES** Immatures have been considered 'impossible to tell with certainty' from corresponding plumages of White-backed [56], but latter always darker, lacking significant contrast, with heavier and deeper bill which, like cere, is all dark until yellowish culmen shows about fourth year (by which time plumage at least mottled black). See also juvenile Red-headed Vulture [66] and White-bellied Fish-eagle [42]. In north India and Himalayan region, care needed in distinction, at all ages, from Griffon and Himalayan Vultures [61, 60] (though latter mostly at higher altitudes): at carcasses, especially if accompanying Long-billed, both are clearly bigger, with heavier beak, while adult Griffon is warmer rufous-cinnamon and Himalayan much whiter with streaky and leathery ruff, juveniles are respectively lighter and much darker, and all are more uniformly downy-headed; in flight, when size less obvious and colours vary with wear and light, both have similar patterns but blacker and more bulging secondaries and whiter head, while Himalayan is longer-tailed and has more solidly black greater coverts above.

**VOICE** 'Hissing and cackling by young and adults' (B&A).

**FOOD** Exclusively carrion, often of cattle, but also of deer, boars *Sus scrofa* and other wild mammals, as well as human corpses. Forages by soaring singly and watching activities of ground predators, crows, kites and other vultures. Will roost on ground by carcass, even feed by moonlight.

**SOCIOSEXUAL BEHAVIOUR** Gregarious, sometimes in feeding or roosting groups of 20–30+, often with White-rumped [56], but also solitary where less common. Aerial courtship at least involves mutual circling.

**BREEDING** Solitary or, more usually, colonial. Mid November–May in India, but eggs recorded October in Burma. Either fairly large nest, 60–90 cm across and 35–50 cm deep, of leafy sticks, lined with straw, skin, rags and other rubbish, at 7–14 m in tall tree and often near village (north India to southeast Asia); or much flimsier platform (which may disintegrate by time chick fledges), of similar breadth but only c15 cm deep, on cliff ledge or hill fort (peninsular India); usually in small loose colonies, sometimes up to c20 pairs. Clutch 1. Incubation c50 days. Fledging period not recorded.

**POPULATION** Early in 20th century extended over more than 5 million km<sup>2</sup>, but now reduced to less than 5 million km<sup>2</sup>, and decreasing fast. Few data on densities (though see below), and confusion with immature White-rumped Vultures [56] has certainly led to its being overlooked, but generally considered much less numerous, and less successful in urban and wooded habitats. Until 1997, still regarded as common throughout its Indian range and probably in five or six figures, while the main contractions in distribution and numbers had involved only the eastern population of the bare-headed form *tenuirostris* (see Geographical Variation) which,

outside the Indian region, already had no more than relict representation in central and southern Burma (no recent data) and parts of Cambodia and Laos (see White-rumped Vulture for discussion). Now, however, both *tenirostris* and nominate *indicus* are – since about 1997 and reaching a peak in 2000 – suffering a crash similar to that of White-rumped (which again see). In Nepal, where *tenirostris* was considered ‘fairly common’ in the early 1990s, there have been major declines and in the Keoladeo National Park, Bharatpur, Pradesh (1989) recorded that the resident feeding population of nominate *indicus* (which breeds only 50 km outside the Park) crashed by 97% from a peak of 816 birds (28 birds/km<sup>2</sup>) in 1985/86 to only 25 (0.86 birds/km<sup>2</sup>) in 1998/99. By mid 2000 these and other *Gyps* vultures ‘were being found dead and dying in Nepal, Pakistan, and throughout India, and major declines and local extirpations were being reported’ (BirdLife International, and again see under White-rumped). Following the crash, the total world population of this once common vulture is now put by BirdLife International in the range 2,500–10,000 birds, and classed as critical (see under White-rumped).

**GEOGRAPHICAL VARIATION** Two distinct forms – which replace each other geographically and have clear differences in bill structure, and head and thigh covering, as well as in nesting and social behaviour –

have traditionally been treated as conspecific, and it is as races of one species that they are included here. Some authorities have, however, considered them two distinct species in the past, and a stronger case for doing so is now being made (see Rasmussen & Parry).

*G. i. indicus* (southeast Pakistan and peninsular India south of Gangetic Plain) Less slender bill; sparse and patchy covering of down on head and neck; tully feathered outer thighs; pale buff above; flimsy nest on cliff, crag or building.

*G. i. tenirostris* (Kashmir, India north from Gangetic Plain, and Nepal to southeast Asia) Slenderer and longer looking bill with larger nostrils; completely bare and almost shiny blackish head and neck; downy outer thighs; slightly darker and browner above; more substantial nest in tree.

**MEASUREMENTS** *G. i. indicus* ♂♀ wing 560–650 mm, tail 238–274 mm, tarsus 90–109 mm. *G. i. tenirostris* ♂♀ wing 590–630 mm, tail 237–256 mm, tarsus c110 mm. **Weights** *G. i. indicus* ♂♀ 5.5–6.5 kg (five).

**REFERENCES** Ali & Ripley (1978), BirdLife International (2000), Deignan (1963), Delacour & Jabouille (1931), Duckworth *et al.* (1999), Grimmett *et al.* (1998), Grubb (1980, 1989), Humphrey & Bain (1990), Inskipp & Inskipp (1991), King *et al.* (1975), Lekagul & Round (1991), Medway & Wells (1976), Prakash (1999), Rasmussen & Parry (2000), Ripley (1982), Roberts (1991), Round (1988), Smythies (1986), Wells (1999).

## 59 RÜPPELL'S VULTURE *Gyps rueppellii* (AE Brehm, 1852)

Plate 22

Other name: Rüppell's Griffon

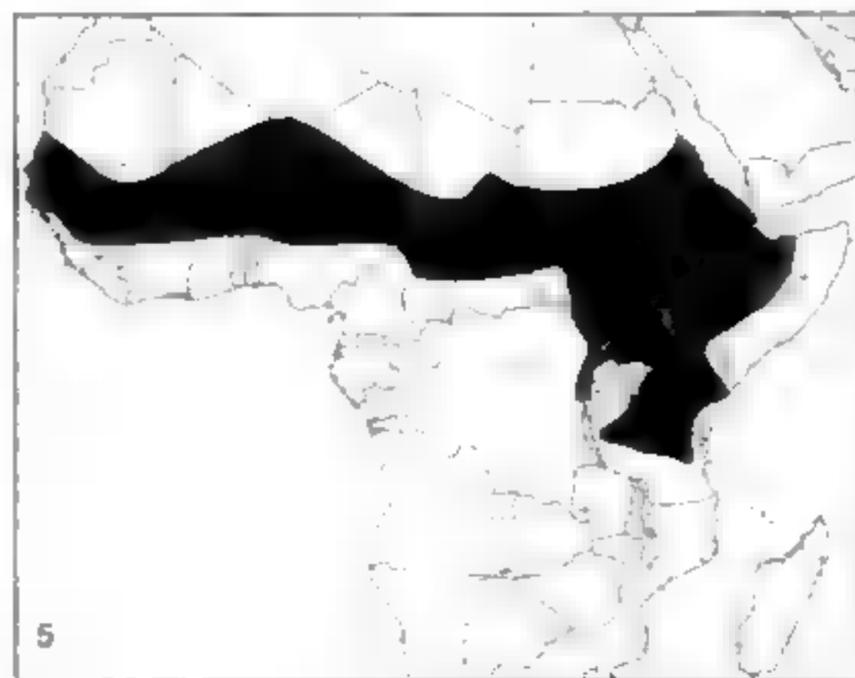
**DISTRIBUTION** Afrotropical (19°N to 6°S); order 5; uncommon in parts of West Africa, but otherwise generally common to locally abundant. Endemic to relatively narrow belt of arid sub-Saharan Africa from Senegambia and Guinea east to Ethiopia and thence south to dogleg central Tanzania; because of dependence upon cliffs and other high rock faces with ledges for nesting, breeding known only in north Guinea, Upper Volta, Mali, Niger (in Sahara's Air Massif), north Nigeria, south Chad, central and south Sudan, Ethiopia, Kenya and north Tanzania, but regularly forages and feeds on – particularly in sub-adult stages – simply wanders west into Senegambia,

north into southwest Mauritania, and well south of West African breeding range in dry season (e.g. into northern parts of Ivory Coast, Ghana and Cameroon); farther east, also into Djibouti, Uganda and possibly northwest Somalia and northeast DR Congo.

**MOVEMENTS** Generally regarded as non-migratory, though foraging up to 150–200 km from base and, as noted above, moving north and south in Sahel and savannah of West Africa in response to drought and rains. Non-breeders may sometimes also disperse considerably farther. Although several first-half 20th century reports from Saudi Arabia and Yemen in January–February have now been questioned, one out of two records for Nouadhibou at 21°N in northwest corner of Mauritania involved sizeable group of 43. Also, single vagrants recorded several times in Egypt and more recently, and much more unexpectedly for such diagonally opposing directions, in both Spain and northeast South Africa during early 1990s.

**HABITAT** Dry open country; cliffs, gorges or inselbergs normally essential for nesting and roosting, but also forages in open savannah, thornbush and subdesert; even when gorged, seldom roosts in trees. Generally avoids human settlements, but some association with people in Ethiopia and Kenya. Sea-level to 4,500+ m.

**FIELD CHARACTERS** Largish vulture, as adult mostly blackish or creamy and blackish, with fairly heavy bill, bare-looking head and neck (latter relatively long and thin), downy or straggly ruff. Walks and runs quite easily with lolloping gait; long wings cover short tail. Sexes



similar in both plumage and size, female rarely even averaging larger; juvenile distinguishable; as adult after seven or more years.

**PERCHED Adult** Brownish-black (grey-black in fresh plumage), plain on flight-feathers and tail, evenly and distinctively scaled above and tipped below with creamy-white (but see Geographical Variation); neat white downy ruff; dirty blue-grey skin of head and neck more or less covered (least on face and on more flesh-pink foreneck) with short, sparse whitish down (like ruff, often grey with dust and sometimes soiled with blood); eyes grey to yellow-brown; mainly yellow bill; two small bare spots at basal neck-sides blue, edged pinkish.

**Juvenile** Lacks adult's contrasted scaling; dark brown, fringed and streaked paler above, and thinly buff-streaked below, with straggly brown and buff-streaked ruff; dull grey-blue skin of head and neck more densely covered with brownish-white down, except on face; eyes and bill browner. **Immature** Little change during second and third years, except that thicker down on head and neck gradually lost (exposing patches of blue to pinkish skin), pale feather-tips become larger and, particularly on mantle, shoulders and underparts, begin to obscure darker centres. From fourth year brown ruff replaced by white, increasing contrast between blackish feather-centres and pale edges, streaking disappears below, and bill turns dull horn. But not fully adult until at least seventh year. **Bare parts** Adult eyes yellow-brown to pale grey (? oldest birds), juvenile browner. Adult bill pale yellow, sometimes more reddish towards base, juvenile brown. Cere and bare face dark blue-grey, lower fore-neck pinkish. Crop-patch blackish-brown. Basal neck-spots grey-blue, edged flesh. Feet blue-grey.

**FLIGHT** Large raptor with long broad wings with somewhat bulging secondaries, short rounded tail (becoming squared or wedged with wear), bare-looking head and neck, neat or straggly ruff. Wingspan 2.6 times total length. Take-off laboured, particularly if well fed; slow beats; glides and soars with wings level or raised in slight dihedral, bowed at carpal joints when gliding. Average speed 47 km/h. **Adult** Dark with clear scaling, blackish flight-feathers and tail, and white ruff and inner thighs; above, mantle more uniformly black than scaled wing-coverts, which also show two pale lines towards rear; below, wing-linings also with rows of white spots, forming distinctive pattern of two thin white lines on rear coverts in addition to main bar near leading edge. **Juvenile** Browner, with whiter head, inconspicuous dark ruff, pale-streaked underbody and inconspicuous pale inner thighs; lacks adult's whitish lines on upperwing-coverts, but has similar if less distinct pattern on underwings, with one broader band at front and three to four thinner lines behind. **Immature** Juvenile wing pattern continues through immature stages, while body becomes paler (because of broader pale tips), and then darker with more contrasted markings.

**CONFUSION SPECIES** Adult unmistakable on ground, but in flight from below at longer ranges, when underwing lines difficult to see, can be confused with Lappet-faced Vulture [64] (much more uniform above; below, has streaky breast, all-white thighs, and only one band of white on wing-linings). Juvenile and earlier immature stages often confused on ground with young White-backed [57] (slightly smaller and shorter-necked, with

blackier bill, eyes, head skin and legs, and paler-streaked rather than paler-edged above, but may appear lighter or darker at different ages; in flight, only single whitish band on wing-linings, becoming forked or double with increasing age). Juveniles and immatures of north-eastern race *erlangeri* likely to be confused in Ethiopia, Egypt and southwest Arabia with Griffon [61] (larger, paler, soaring on slightly raised wings with more uniform linings, and crop area buff to grey-brown, not dark brown).

**VOICE** Usually silent. Perhaps noisier at carcasses than White-backed [57], with similar range of squawks, squeals and, from dominant birds, hisses. Harsh grating noises at nest.

**FOOD** Carrion: intestines and softer flesh of mainly large dead mammals. Often leaves cliffs only one to two hours after sunrise, using updrafts in place of thermals. Later forages over open country, mainly flying below 300 m (though up to 1,200+ m where ungulates scarce), in much same way as White-backed [57], with which competes directly for food, though longer neck allows deeper penetration. Often in similar numbers at carcass. Full crop may contain up to 1.5 kg of meat.

**SOCIOSEXUAL BEHAVIOUR** Highly gregarious, breeding in colonies of tens to hundreds (even up to 1,000 pairs) and similarly cliff-roosting in tens, hundreds, or thousands where particularly abundant; also congregates in numbers at carcasses. Pair-members soar and circle together, and spend long periods perched at or near nest-ledge.

**BREEDING** Colonial. October–May in West Africa to Ethiopia, but variously throughout year in East Africa. Initially small nest of sticks, c60 cm across and c20 cm deep (may be completely hidden by sitting bird), but can grow to 1.5 m by 1 m with repeated use over years, lined with grass and green leaves, on open rock ledge or more hidden in crevice. All the few reports of tree-nesting – in The Gambia, Senegal, Chad, Uganda and, most recently, Cameroon – are considered likely to involve misidentifications of White-backed [57] (Mundy *et al.*). Clutch 1. Incubation c55 days. Fledging c150 days.

**POPULATION** Commonest vulture of arid Sahel and northeast African mountains, locally in huge numbers: estimated total population in early 1990s of 30,000 individuals (Mundy *et al.*), with 3,000 breeding pairs in Tanzania and 2,000 pairs in several other countries (e.g. Ethiopia, Sudan, Kenya). Sometimes at risk from poisoned carcasses and said to have declined in Sudan and parts of Kenya. Like other vultures, falls victim to gunmen in areas of civil war, such as Somalia; also killed for use in traditional medicine.

**GEOGRAPHICAL VARIATION** Two races.

*G. v. rueppellii* (whole range except northeast) As above.

*G. v. erlangeri* (Ethiopia to Somalia) Smaller, paler, browner, with creamy feather-edges broader and less sharp, so that dark centres almost lost; in flight, underbody looks uniformly paler than wing-linings (which have same pattern of lines as nominate race).

**MEASUREMENTS** *G. v. rueppellii* ♂♀ wing 670–710 mm, tail 260–290 mm, tarsus 102–110 mm. *G. v. erlangeri* ♂♀ wing 625–665 mm. **Weights** *G. v. rueppellii* 6.8–9.0 kg. *G. v. erlangeri* 6.4 kg (one).

**REFERENCES** Baunerman (1953), Brown & Broton (1980), Brown *et al.* (1982), Cramp & Simmons (1980), Gallagher & Woodcock (1980), Gore (1990), Hollom *et al.* (1988), Houston (1974a-b, 1975, 1976, 1989, 1990, 1993), Jensen & Kirkeby

(1980), Kruuk (1967), Lippens & Wille (1976), Mackworth-Praed & Grant (1957-73), Meinertzhagen (1954), Morel & Motel (1990), Mundy *et al.* (1992), Nickolaus (1987), Pennycuik (1971a, 1972, 1985), Thiollay (1978c).

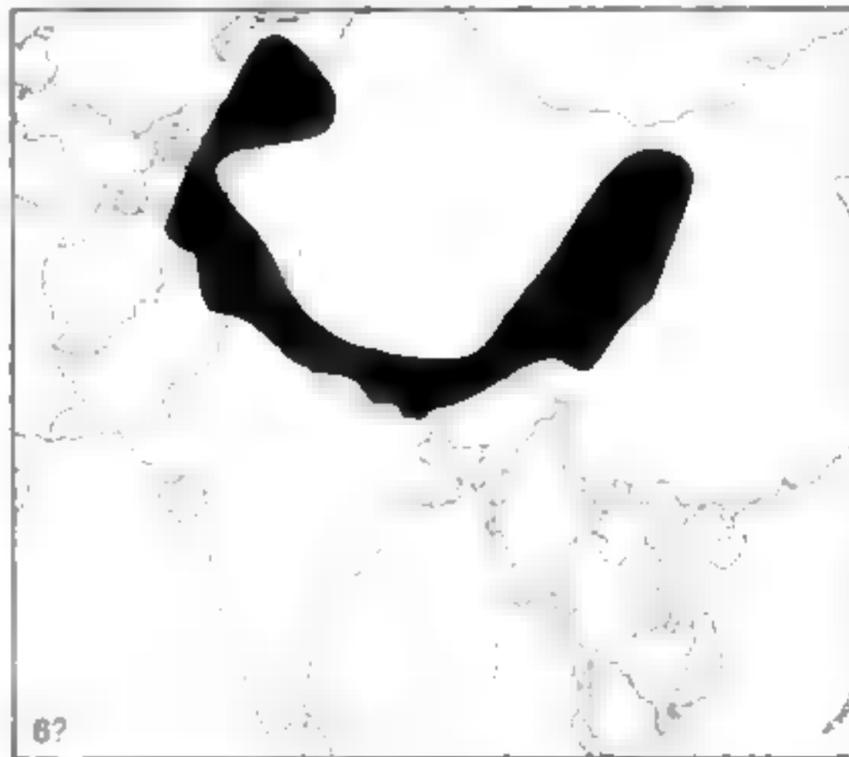
## 60 HIMALAYAN VULTURE

*Gyps himalayensis* Hume, 1869

Plate 21

Other names: Himalayan Griffon or Griffon Vulture

**DISTRIBUTION** Palearctic and adjacent Indomalayan (44°N, or just possibly c 49°N, to 26°N); order 6?; apparently common in south and west of range (but see under Population), and uncommon to rare elsewhere. Mountains of south-central Asia: Himalayas in north Pakistan, Kashmir, India, Nepal and Bhutan through Tibet and north Assam (Arunachal Pradesh) into central China (northwest Sichuan, Qinghai, Gansu and Ningxia-Hui) and, in west of range, through northeast enclave of Afghanistan into former Russian and Chinese Turkestan, including mountains of Pamir, Kirgiz and Tien Shan, perhaps also Tarbagatzy and Altai.



**MOVEMENTS** Basically sedentary, but forages over vast areas; some seasonal altitudinal movements from highest regions. More nomadic immatures occasionally wander to lower levels in valleys and on plains immediately south of Himalayas.

**HABITAT** Open mountains, gorges, high steppes and plateaux; sometimes lower valleys. Mostly 1,200 m to 4,500 m, but foraging to at least 6,000 m and at least juveniles regularly recorded wintering down to 175 m near Bharatpur during 1985-92.

**FIELD CHARACTERS** Huge bulky vulture, strongly contrasting cream and blackish as adult but dark as juvenile, with stout but not large bill, rather small down-covered head and neck, loosely leathery (not downy) ruff, long wings and shortish tail. Shape and behaviour when settled comparable to Griffon Vulture [61], but wing-tips may not cover tail? Sexes similar, and no recorded difference in size; juvenile distinct; pattern of moults to adult perhaps parallel to Griffon.

**PERCHED Adult** Mainly light tawny to sandy-white above

with slightly browner centres, and strongly contrasting blackish tail, flight-feathers and greater wing-coverts (last thinly pale-edged or only pale-tipped); greyish skin of head and neck more or less completely covered by creamy filamentous feathers; feathery ruff darkish buff with whitish shaft-streaks, but downier and white at front base of neck, where disrupted by pale brown crop and, as on other griffons, bare circular blue-grey to purplish-pink patches at each side of that; underbody pale buff to cream with whitish shaft-streaks, whiter thighs and crissum. **Juvenile** Dark brown above and more chocolate below, with pale buff to whitish shaft-streaks strongest on ruff, wing-coverts and underbody, and whitish inner thighs, all contrasting with plain quills nearly black in fresh plumage; head and neck completely covered by almost white down; crop-patch darker brown than adult. **Second- to fourth-year** Probably much like juvenile, but sequence of change unclear. **Fifth-year onwards** Gradually becoming like adult over at least two more years. **Bare parts** Adult eyes pale yellow, juvenile light brown, immature creamy yellow. Cere light brown or greenish-brown, and bill paler yellow-horn. Grey head skin largely covered. Legs greenish-grey to whitish.

**FLIGHT** Massive raptor with small head protrusion, bulging secondaries and seven fingers on very long broad wings, and shortish rounded tail (last relatively long for *Gyps*, and can look squared or wedge-shaped with wear); wingspan 2.6 times total length, tail about two-thirds length of wing-base. Flight actions probably much as Griffon Vulture [61]: 'wings are held straight out and stiff' (B&A), but more likely to soar in shallow V like congeners? **Adult** Above, creamy head (unless soiled), only slightly darker ruff, and sandy-white forewings and body, including very white-looking rump, contrast sharply with more or less black tail and flight-feathers (secondaries slightly browner), and almost unbroken black line along primary and greater coverts and blotches on longer scapulars; similar contrast below, with creamy-buff body, whiter wing-linings, blackish flight-feathers (including secondaries), and obscurely dusky-spotted greater coverts. **Juvenile** Apart from whitish head, looks all dark above, though pale shaft-streaks - especially on ruff, scapulars and wing-coverts - show up at closer ranges, when quills also seem to be blacker than body and forewings; clearer pattern below, where whitish head and ruff may highlight brown crop-patch, and whitish inner thighs sometimes show, while body and wing-linings more clearly shaft-streaked with white. **Immatures** See previous paragraph.

**CONFUSION SPECIES** Adult most likely to be confused, in south and west of range only, with Griffon Vulture [61], which is generally smaller (some overlap in size) - in particular, relatively shorter-tailed - and tends to

forage at lower altitudes (much overlap): it is also significantly less pale and more rufous (but beware of bleaching in worn plumage) and, as adult, has whiter downy ruff, less solidly black upperwing-coverts and more extensively blotched scapulars. Juvenile and younger immatures more closely resemble Monk Vulture [63] (but that more uniformly dark ~ without pale streaking, and lacking white on head and around crop-patch ~ with massive black bill and contrasting pale cere, as well as, in soaring flight, more parallel-edged wings held flat). See also adult and juvenile Long-billed Vulture [58] (mostly at lower altitudes, smaller, thinner-billed, narrower-winged and, as adult, bare-headed), juvenile White-rumped Vulture [56] (again mostly lower, smaller, with dark bill, shorter tail, less square-ended wings, browner secondaries, more distinct marks on wing-linings) and perhaps also adult White-bellied Fish-eagle [42] (much smaller, with quite different outline, tail pattern, wing shape and wing angles).

**VOICE** 'Variety of grunts and hisses like other large vultures' (B&A).

**FOOD** Exclusively carrion. Forages by soaring singly and searching for carcasses or watching activities of ground predators and other aerial scavengers. Dominant vulture, unless Monk Vulture [63] present.

**SOCIOSEXUAL BEHAVIOUR** Solitary to loosely gregarious, sometimes in groups of 10-20 at carcass or roost. No aerial courtship recorded other than mutual circling.

**BREEDING** Solitary or social. January-August (end December-September), but c1 month later in Kargiz and Tien Shan than in Himalayas. Fairly large and rough

stick nest, increasing in size with successive use, lined with rubbish, on ledge or in open crevice of sheer cliff; old nest of Lammiergeier [53] sometimes used; singly, or few pairs scattered on same cliff face. Clutch 1. Incubation c50 days. Fledging period not recorded, but whole nesting cycle said to last 6-7 months (B&A).

**POPULATION** Evidently common in Himalayas and Chinese Turkestan, and perhaps still 'abundant' in Tibet (see B&A), but uncommon in central China and apparently rare on Kazakh side of central Asian mountains. Total range covers 2.5-3 million km<sup>2</sup> and, though generally at lower densities than Griffon Vulture [61], average of only 1 pair/300 km<sup>2</sup> would give six-figure population. Carcasses of dead pack-animals along well-used trade routes presumably provide fairly reliable source of food. Unclear whether this species is affected by the late 1990s population crashes among the other *Gyps* vultures at lower altitudes in Pakistan, India and Nepal (see under White-rumped [56]), but Prakash found that, whereas juveniles wintered regularly in Keoladeo National Park, near Bharatpur, during 1985-92, none were seen there from 1996-97 onwards.

**GEOGRAPHICAL VARIATION** Monotypic. Forms a superspecies with Long-billed, Rüppell's, Griffon and Cape Vultures [58-62], together often grouped as 'griffons'.

**MEASUREMENTS** ♂♀ wing 755-810 mm, tail 365-402 mm, tarsus 110-126 mm. **Weights** ♂♀ 8-12 kg.

**REFERENCES** Ali & Ripley (1978), Cheng Tso-shan (1987), Dementiev & Gladkov (1951), Eucheropau & Hue (1978), Flint *et al.* (1984), Gommert *et al.* (1998), Inskipp & Inskipp (1991), Knystautas (1993), Meyer de Schauensee (1984), Prakash (1989), Ripley (1982), Roberts (1991), Vaurie (1965).

## 61 GRIFFON VULTURE *Gyps fulvus* (Hablizl, 1793)

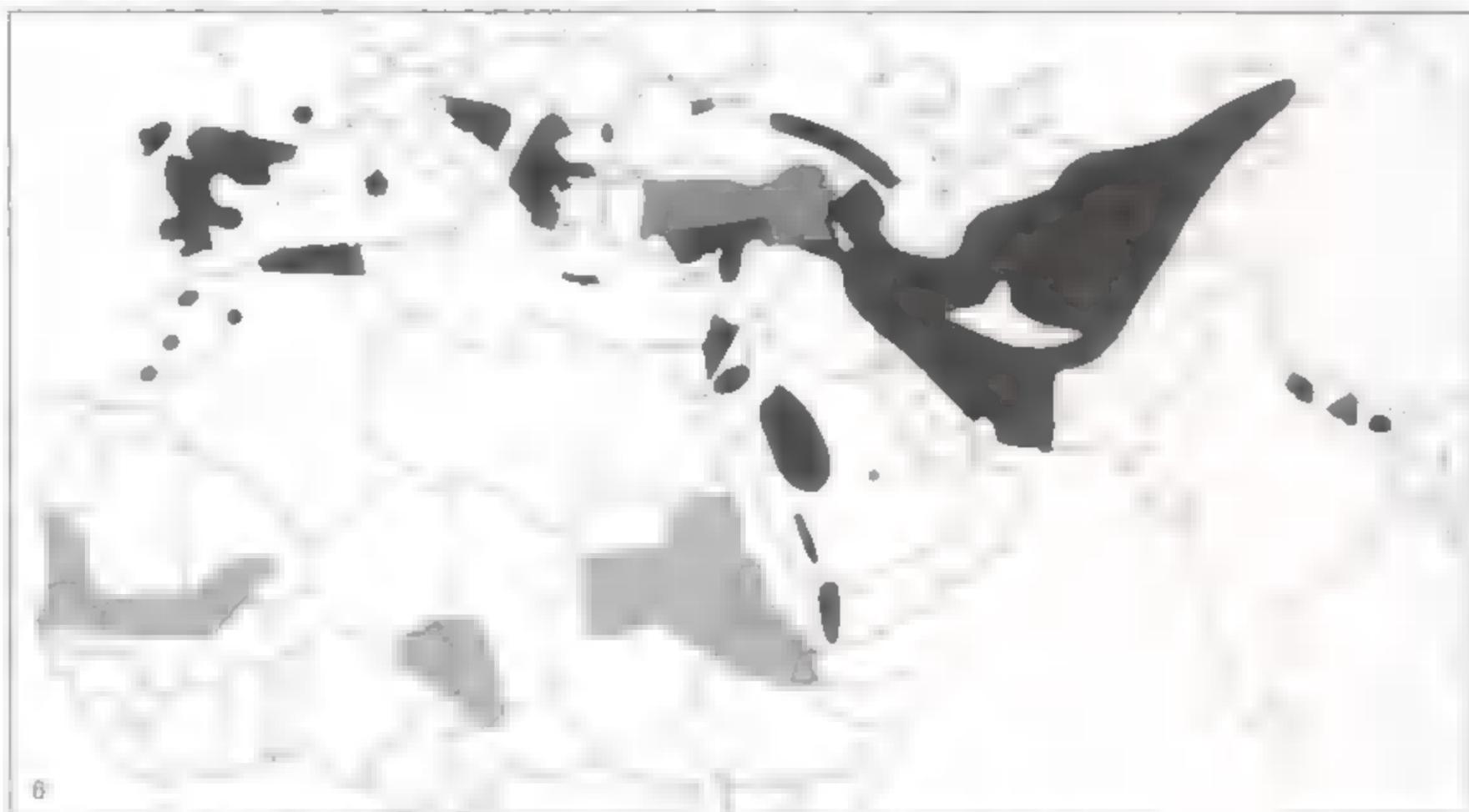
Plate 20

Other names: European or Eurasian Griffon

**DISTRIBUTION** Palearctic, northwest Indomalayan and, marginally, northeast Afrotropical (18°N to 13°N); order 6; generally declining, and extinct in various western parts of range where formerly numerous, but still locally common and in some areas increasing again through protection or reintroductions. North Africa, south Europe (especially Spain) and southwest and central Asia: somewhat discontinuously in northwest Africa, Iberia, south France, Sardinia, Italy, Balkans, Crete, Cyprus, Crimea, Caucasus, Asia Minor, Middle East (south to Jordan, Israel and Sinai), thence east through Iraq, Iran and Afghanistan before dividing into two arms around high mountains of central Asia, one extending up into Kazakhstan and region of Lake Balkhash, the other reaching across Pakistan, and northern India to mainly lowland Nepal, more uncertainly to Bhutan and probably only straggling to Assam, where replaced by Himalayan Vulture [60]; also central and western Saudi Arabia, Yemen and possibly still north Sudan.

**MOVEMENTS** Adults from most of breeding range more or less sedentary, whereas juveniles and other

immatures often disperse or even make distinct south-north migrations. Over much of Turkey whole population apparently moves out for winter. Variable numbers of Iberian juveniles pass across Straits of Gibraltar, while others from east Europe and Asia travel down via Bosphorus-Levant or Iran in September-October/November and return April-May (February-early June). Migrants from Iberia probably winter mainly in Morocco, but occasionally reach Rio de Oro, Mauritania, Niger and even Senegal, while migrants from the eastern populations winter in parts of Arabian Peninsula, including Aden and Oman, and Ethiopia, perhaps also Egypt and Sudan, and have wandered to Libya and Somalia; interestingly, new studies in west Balkans (Croatia) reveal possible complex long-distance circular migration by juveniles leaving in September, some moving initially northwest (to Austrian/Italian Alps) and others southeast (to south Italy, Greece, Bulgaria, and as far as Chad), and perhaps then on to Spain, returning to Croatian colonies only when mature (i.e. after five to six years). To the north of the breeding range there are (mostly old and some questionable) records from England (recently rejected), Ireland, Belgium, Netherlands, Switzerland, Denmark,



Norway, Sweden, Finland, Germany, Poland, Czech Republic, Slovakia, Hungary, Urals, Kirghiz Steppes and western Siberia.

**HABITAT** Needs sheer or steep cliffs, gorges or other rock outcrops, preferably with overhangs, for breeding and roosting, but forages over wide variety of mainly dry open country from lowland cultivation, steppe and semi-desert to mountain slopes and plateaux. Sea-level to 3,000 m, foraging up to 3,500 m or even higher; also shown to fly at altitudes of 10,000 m and more.

**FIELD CHARACTERS** Huge bulky vulture, strongly two-toned shades of pale brown and blackish in all plumages, with stout bill shorter than head and deeper than broad at base, rather small downy head and long neck, loosely feathery ruff, long wings, and shortish tail and legs. Spends much time perched openly on cliff ledge or, less often, tree, but, after feeding, frequently stands around on ground or nearby mound or rock; when resting, head usually hunched between shoulders; wing-tips completely cover tail. Sexes similar, though females average 5% larger and 7% heavier, juvenile distinguishable in reasonable conditions, but not fully adult until 6 years old and intermediate stages need close attention to moult patterns of flight-feathers and colours of bill, head and ruff; moults are slow, lengthy, suspended after breeding season, take more than a year to complete, and some juvenile flight-feathers retained into third year.

**PERCHED Adult** Mainly pale sandy-brown to creamy above, with variable grey tinge (or more rufous tone in Indian region; see Geographical Variation), and feather-centres more or less darker than edges to give slightly mottled effect at close range, all strongly contrasting with black or blackish tail and flight-feathers and distinct row of black centres to round-tipped greater coverts; whole head and neck densely covered with short downy feathers, creamy on crown and lower foreneck, whiter on throat, cheeks, and back and sides of neck (but off-white in worn plumage and all sometimes partly or entirely soiled darker, when head can look more like

juvenile's); white ruff of long loose down above pale brown crop edged by white down and bare circular patches of pale blue (which turn purplish-blue in excitement); underbody pale sandy-buff to cream (older birds), plain or with thin whitish shaft-streaks on belly and flanks. **Juvenile** Broadly similar in pattern to adult, but darker-looking, more rufous-brown above reducing contrasts between wing-coverts and black flight-feathers; greater coverts longer, pointed and all dark but for paler tips, thus lacking adult's row of distinct black blotches, while lesser and median coverts indistinctly pale-streaked; less densely downy head and neck off-white at best, more often yellowish-brown to greyish, especially on face, even when clean; ruff of long narrow feathers, brownish-buff striped by paler and more rufous edges, above pale rufous-brown to creamy-buff crop; whole underbody paler rufous-brown than upperparts, with variably distinct whitish shaft-streaks (usually stronger than on adult). **Second/fourth-year** Colours of bill, eyes, head and ruff can remain as juvenile, or variably start to change from third year onwards, but moult of upperwing-coverts (and remiges; see Flight) begins in second year with mix of new, paler and more rounded lessers and medians, and perhaps the odd darker-centred greater; this covert moult is completed during third year while underbody also tends to become less distinctly streaked; by fourth year, when may start breeding, body plumage and wing-coverts largely as adult, though upperparts not so pale and indistinct shaft-streaks still show on lesser and median wing-coverts, but at least ruff and head still more of juvenile type. **Fourth/sixth-year** No juvenile flight-feathers remain, and almost all of plumage adult, along with more or less pale bill and eyes (see Bare parts), but downier ruff still buffish or brownish-white, face often greyish, and crop dark brown. **Bare parts** Adult eyes pale yellowish-brown to richer golden-brown, or brownish-yellow with increasing age; juvenile and second-year dark brown, starting to turn paler from third year but often showing no yellow until fourth or fifth. Cere always grey, but individually

varying from bluish-grey to dark grey. Adult bill pale yellowish-horn to greenish-yellow with dusky base; juvenile to second- or third-year blackish-grey, then gradually lightening from tip over remaining immature years. Bare skin at sides of neck pale blue-grey, darker in excitement. Legs always grey, but varying individually in shade from greenish-grey to brownish-grey, even bluish-tinged.

**FLIGHT** Huge raptor, bigger than most eagles, with small head protrusion, bulging secondaries and indented narrower seven-fingered hand on long and fairly broad wings, short squarish tail (often looking slightly rounded or wedged through wear or moult) about two-thirds wing-base; wingspan 2.5 times total length. Active flight heavy and laboured with few slow deep beats, then short glide; glides on flat or bowed wings, hands often drooping; soars endlessly on wings raised in shallow V.

**All plumages** Usually readily identified by strong two-toned contrast, particularly from above, between pale body/wing-coverts and blackish flight-feathers/tail (though in some lights at longer ranges whole bird can look dark).

**Adult** Above, whitish head and ruff (can look brown through soiling), pale sandy to creamy body and wing-coverts (variably with grey or rufous tinge), sometimes whiter on lower back and rump, all contrasting with row of discrete black centres along greater coverts and black or grey-edged remiges and black tail; below, comparable contrast – but less marked – with pale bill, head and ruff, dark crop, sandy-brown body and leading edges to wings (variably tinged grey or rufous and streaked paler), creamy or whitish patagial bars and broad diagonals across variably mottled wing-linings, greyish remiges with darker edges, and black tail. Note that trailing edges of wings and tail are fairly straight with rounded feather-tips, though some unevenness often caused by differences in length between new and abraded old feathers.

**Juvenile** Pattern similar, still showing contrast between body/wing-coverts and flight-feathers/tail, but, above, light rufous-brown body and wing-coverts with paler streaks distinctly darker than on adults, dark brown greater coverts with only pale pointed tips merge more into black or brownish-black flight-feathers; below, head less downy and face darker with blackish bill, ruff rusty-brown but crop creamy, underbody paler rufous-brown than upperparts and with whitish shaft-streaks variable in size and extent, wing-linings usually paler than adult with less distinct diagonals, but this very variable. Note that all feathers have pointed, not rounded, tips; this obvious where greater coverts overlap flight-feathers and, especially, in serrated trailing edges to wings and tail; wings also look narrower than on adult.

**Immatures** Plumage differences between age-classes small (see previous paragraph: much as juvenile in first two years, much as adult from fourth), but ageing possible in flight mainly by moult pattern: after first moult, starting first summer and suspended by second winter, some inner primaries (sometimes also few secondaries and central tail-feathers) renewed; following second moult, from end of second winter through summer, only some outer primaries and middle secondaries still juvenile (replaced in subsequent summer), so that third-winter/ third-summer birds best aged by these old feathers being sharply pointed and faded and also producing less evenly serrated trailing wing-edges.

**CONFUSION SPECIES** Almost unmistakable in West

Palaearctic on combination of size, relatively small pale head, long pale neck, white or brownish ruff, two-tone upperwing pattern, and, in flight, short squarish tail, long broad wings with bulging secondaries, somewhat indented inner primaries, and splayed fingers (though inexperienced observers should beware that certain plumages of some *Aquila* eagles [especially 219–222], albeit smaller, show some of these features when soaring at distance). Only other vulture of comparable size and shape in most of extensive Palaearctic range is bulkier-looking Monk Vulture [63] (old adult can be brown above and largely white-headed, but usually traces of black around and below eyes, head larger and peaked at rear above much more extensive ruff which makes whole neck look thick up to nape, little colour contrast between wing-coverts and remiges and, in flight, longer wedge-shaped tail and parallel-edged wings – with serrated ups to secondaries at all ages – held slightly arched, not raised, when soaring). In Middle East, only other conventionally shaped vulture – also widespread in sub-Saharan Africa – is Lappet-faced [64] (more like Monk Vulture in bulk and even larger, with similar serrated trailing edges in all plumages and, although neither so evenly dark nor so rectangular-winged as Monk, and although juvenile has wing-coverts slightly paler than flight-feathers above, never the distinct contrast that Griffon shows both above and below). Elsewhere, it becomes more important to start by determining approximate age of each bird by state of moult (see individual texts), but, for example, juvenile *Gyps* vultures have uniformly pointed feathers, obvious on wing-coverts when perched and in evenly serrated trailing wing-edges in flight, immatures have mixture of pointed (old) and rounded (new) tips, and from fourth year onwards entirely rounded (though still mixture of new and older). In fact, adults of other vultures generally present little difficulty (see individual species texts and plates), but juveniles can be confusing. Vagrant Griffons wandering to northern tropical Africa would have to be distinguished from the congeneric Rüppell's Vulture [59] (adult and fourth- to sixth-year unmistakable; juvenile and second/third-year rather more Griffon-like, darker, but down of head and neck sparser at all ages, with areas of more or less pinkish and, later, blackish-grey skin showing through) and White-backed Vulture [57] (adult and older immatures have white lower back/rump, and whitish wing-linings contrasting strikingly with dark remiges; juvenile and second/third-year again more Griffon-like, but smaller, shorter-billed, with bare dark grey facial skin). In northern Indian region, slightly paler and more rufous local race of Griffon (see Geographical Variation) similarly needs to be distinguished from no fewer than three other *Gyps*. Though smaller and less heavy-headed, Long-billed Vulture [58] is more prone to confusion in flight with Griffon because of contrast between pale contour-feathers and blackish remiges and tail: this applies particularly to adult and older immatures, though these are readily distinguished when perched by largely bare blackish head and neck and pale or, in northern form *temuratus*, pale-tipped bill; juvenile darker above but distinctly whitish-streaked, paler below and buff-streaked, but shows similar contrast at distance. Himalayan Vulture [60] less difficult, though head, neck, bill and cere much as Griffon, because adult

and older immatures clearly paler, and juvenile and younger immatures considerably darker: adult has very pale coffee to cream body and upperwing-coverts (greaters lacking blackish centres of Griffon), thus contrasting still more markedly with dark remiges and tail, while in flight wing-linings are white (but for thin dark leading edges), appearing even paler than underbody; juvenile, on other hand, mainly dark brown, pale-streaked above and whiter-streaked on underbody, showing little contrast with quills. Finally, mainly blackish adult White-rumped Vulture [56] unmistakable, with white lower back/rump and wing-linings, and contrasting grey secondaries above; juvenile and younger immatures all darkish brown, including lower back/rump, with faint paler streaks on upperwing-coverts that contrast little with remiges, and thin whiter streaks below, blackish-grey bill turning blue-grey at base in subsequent years, and in flight wing-linings showing only indistinct whitish bar (apart from patagial).

**VOICE** Usually silent in flight, except near own nest. But, like most or all of griffon group *Gyps*, often much noisier at carcasses, roosts and, to lesser extent, colonies than vultures of other genera. At carcasses, aggressive dominant individuals utter repeated drawn-out hisses which, when larger numbers present and quarrels more frequent, may be extended into hoarse nasal bellowing; threatened birds may respond with hoarse sobbing sound like heavy breathing; when approaching each other too closely, short grunts may develop into dry chattering *kekke-kekke-kekke...* or, from subordinates, higher faster screeching. Quarrels at roosts much less intense or prolonged, involving particularly screeches and 'goose-like clamouring' (Glutz). Various grunts, groans, croaks and hisses uttered at nesting sites during greeting, copulation and nest defence.

**FOOD** Exclusively carrion, specialising on the viscera, other softer tissues and stomach contents of carcasses, both fresh and putrid, of medium-sized to large mammals, such as sheep and goats to cattle, horses and camels; sometimes also deer, dogs, hares, foxes and other less bulky species; cetacean, duck and fish also recorded. Forages by soaring singly up to 50+ km from roost and searching for dead mammals or watching activities of ground predators and, especially, other aerial scavengers. Often dominant at carcass, unless Monk Vultures [63] present. Most typically, enters carcass by tearing skin with hooked bill and then breaking ribs, or enlarging anal or other orifices, before cutting meat with sharp sides of upper mandible, thrusting head into abdomen and grasping slippery items with spines on tongue. Sometimes gorges to extent where unable to take off without regurgitating.

**SOCIOSEXUAL BEHAVIOUR** Solitary to gregarious; hunts singly – always also watching other vultures – but numbers readily congregate at large carcasses, and species also roosts socially, nests colonially (occasionally solitarily) and, though typically migrating singly, may form loose concentrations in strong thermals or at sea-crossings. Despite older records of up to 150 and even 'hundreds', 20–40 now more usual maximum at carcass; roosts in groups of up to 15–20 on several ledges of one cliff or sometimes in adjacent trees; colonies usually 5–20 nests, sometimes up to 150; migrant concentrations

usually no more than 5–15, but 40–75 recorded, and sometimes much higher numbers over the course of a single day in late October/early November (see Movements). Aerial courtship generally confined to mutual high-circling in close formation; sometimes one of pair will copy the other's every turn and movement, or male will pick up twig or grass and closely follow female for minutes on end.

**BREEDING** February–September in southern Europe, but January onwards in north Africa and Indian region, and from December in Middle East. Relatively small to rather large platform of sticks and twigs, increasing in size with use in successive years, up to 60–100 cm across and 20–30 cm deep, with some leaves and grass as lining, on ledge, usually under overhang, or in shallow fissure or cave on sheer cliff; sometimes in old nest of Golden Eagle [224] or Lammergeier [53], even tree-nest of Monk Vulture [63]. Clutch 1. Incubation 48–58 days. Fledging 120–132 days; continues to be fed by parents for further 3–4 months.

**POPULATION** Serious long-term decline in parts of Europe, north Africa and Middle East for latter half of 19th century through much of 20th, as result of changes in livestock management affecting potential food supplies, poisoning of carcasses to kill mammalian predators, also shooting and other persecution. Although some signs of recent slight recovery in several areas, as in Sardinia, this decline appears to be continuing in at least parts of Balkans and Middle East, especially Turkey. In contrast, Spanish population – largest in Europe by far – apparently continues to increase apace: in 1989, c8,000 breeding pairs were located, over twice as many as ten years earlier, and by late 1990s this total appeared to have grown to c16,500; in addition, the 1989 survey found some 7,000–8,500 immatures and other non-breeders. Elsewhere, there have been increases in France and Bulgaria, and captive-bred birds established in the French Massif Central (first releases 1981, over 30 pairs breeding by early 1990s) and the Italian Alps, but current total in rest of Europe unlikely to exceed 1,500–2,000 pairs. Thus, European breeding numbers now likely to be 18,000–18,500 pairs, or 36,000–37,000 birds, plus (based on Spanish survey of 1989) possibly another 43–53% of non-breeders, or a combined figure of perhaps 51,000–56,000 individuals. Some 300–1,500 pairs estimated in north Africa and Middle East seem likely to take West Palearctic population to near 60,000 birds. There are no comparable data for remainder of species' breeding range, but area occupied in rest of Asia considerably larger and population believed to be more stable. Thus, it seems safe to expect combined total into six-figure range. Unclear as yet whether the Indian race *fulvescens* (see Geographical Variation) is affected by the population crashes among other *Gyps* vultures in the late 1990s at lower altitudes in Pakistan, India and Nepal (see under White-rumped [56]), but Prakesh found that whereas 25–30 wintered regularly in Keoladeo National Park, near Bharatpur, during 1985–92, only two were seen in 1997/98 and none in 1998/99.

**GEOGRAPHICAL VARIATION** Two races now recognised.

*G. f. fulvus* (whole range except east Pakistan and

northern Indian region south from lower Himalayas) Darker and less rufous, but with creamier ruff and buff to grey-brown crop area.

*G. f. fulvescens* (east Pakistan and northern Indian region from Sind and North West Frontier Province along lower Himalayas of Kashmir and Nepal to Bhutan, south in west to Hyderabad, north Gujarat and c20°N north of Bombay, wandering farther south to the Deccan and east to Assam) Paler and more rufous, crop more cinnamon.

(Other races formerly distinguished have included 'occidentalis', 'hispaniolensis', 'jonesi', 'cinnamomeus' and 'orientalis', but these all now combined with nominate *fulvus*.) Himalayan Vulture [60] and Cape Vulture [62] also formerly considered races of Griffon, but now generally treated as part of superspecies with Griffon and also Long-billed [58] and Rüppell's [59], these five allospecies grouped together as 'griffons'.

**MEASUREMENTS** *G. f. fulvus* ♂ wing 685–750 mm, ♀ 725–775 mm; ♂ tail 280–320 mm, tarsus 107–119 mm. *G. f. fulvescens* ♂ wing 675–740 mm, tail 302–330 mm, tarsus 100–120 mm. **Weights** *G. f. fulvus* ♂ 6.2–10.5 kg, ♀ 6.5–11.3 kg (♂ extremes 4.25–15 kg) *G. f. fulvescens* 7.1 kg (one).

**REFERENCES** Ali & Ripley (1978), Alström (1997), Alvarez *et al.* (1976), Arroyo (1989), Arroyo *et al.* (1990b), Beaman & Madge (1998), Bergier (1987), Bernis (1966, 1983), Bijlsma (1983), Bögel (1994), Bonnet *et al.* (1990), Brown *et al.* (1982), Bundy (1976), Clark & Schmitt (1999), Cramp & Simmons (1980), Dementiev & Gladkov (1966), Dendaletche (1988), Donazar (1993), Donazar *et al.* (1987), Elősegüi (1987, 1989), Etchécopar & Húe (1978), Finlayson (1992), Flint *et al.* (1984), Forstman (1999), Frunkin (1986), Geneto (1985), Genschel (1986, 1995), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Grimmett *et al.* (1998), Grubb (1973), Hagemeyer & Blair (1997), Handrinos (1985), Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1983), Holloway *et al.* (1988), Inskipp & Inskipp (1991), Jaubert (1989), Jennings (1981), Kemp & Kemp (1998), Koenig (1974), Lecomte (1977, 1985), Marinkovic & Orlando (1994), Marinkovic *et al.* (1985), Mundy (1985b), Mundy & Ledger (1996), Mundy *et al.* (1982, 1992), Natorp (1986), Nikolaus (1987), Nogue (1982), Penny-cuik (1973), Perco *et al.* (1983), Pineau & Giraud-Audine (1974), Polo *et al.* (1992), Popov & Verzhutskii (1990), Porter *et al.* (1981, 1996), Prakash (1999), Roberts (1991), Rufino *et al.* (1985), Shirihai (1996), Shirihai *et al.* (1996), Snow & Perrins (1998), Soto (1986), Susic (1984, 1994), Svensson *et al.* (1999), Terrasse (1977, 1985), Terrasse *et al.* (1961), Terrasse (1983), Terrasse & Thautout (1988), Terrasse *et al.* (1994), Thalet *et al.* (1986), Tucker & Heath (1995), Valverde (1959), Valverde & Bernis (1960), Vautic (1965), Welch & Welch (1988), Westernhagen (1962), Wilbur & Jackson (1983).

## 62 CAPE VULTURE

*Gyps coprotheres* (JR Forster, 1798)

Plate 22

Other name: Cape Griffon

**DISTRIBUTION** Afrotropical (18°S to 35°S); order 4+; locally common, but greatly reduced since 1960s and still declining. Endemic to southern Africa: southernmost, central and eastern South Africa into Lesotho and adjacent southernmost Mozambique, and north into east and southeast Botswana; no longer nests in Swaziland, Zimbabwe (though non-breeding roost of up to 150 persists in one central area) or Namibia (six non-breeders remained in 2000).

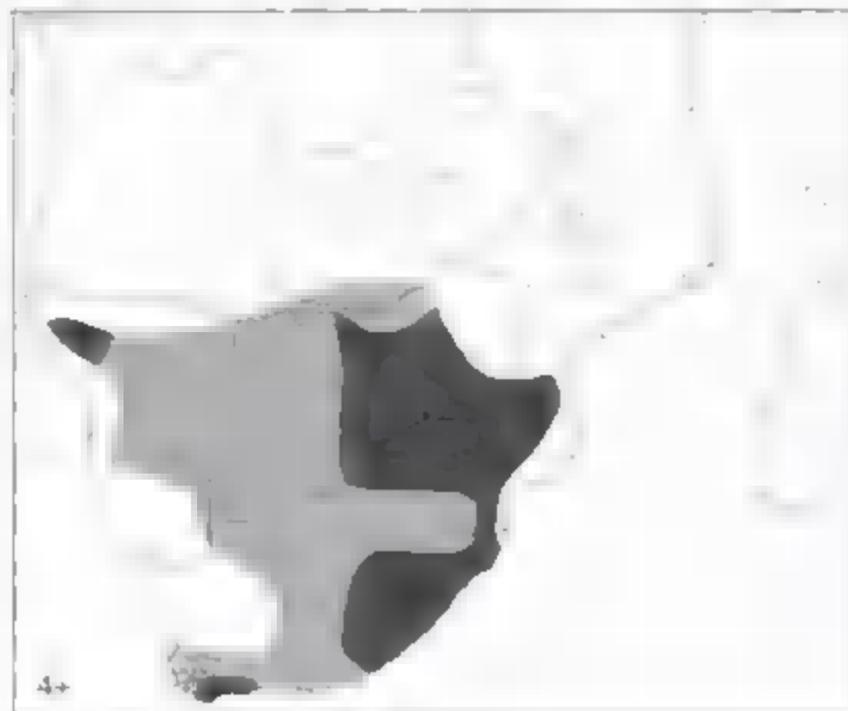
**MOVEMENTS** Adults often largely sedentary, but frequently forage up to 30 km and sometimes up to 100 km; out of breeding season, irregular and temporary

dispersal related to food supply. Immatures wander more widely, especially southwards, averaging 400–450 km and up to 1,226 km recorded. Vagrants north to south Zambia and southern DR Congo.

**HABITAT** Essentially mountain cliffs with suitable ledges for breeding and roosting, even if only isolated mountainous areas in lowland regions, but forages in any open or fairly open country, including desert. Not in dense woodland or forest. Sea-level to 3,000+ m.

**FIELD CHARACTERS** Large bulky vulture, very pale as adult but juvenile darker, with deep powerful bill, bare-looking head and neck naked towards base, neat or straggly ruff. Walks and runs with lolling gait; wings not quite covering shortish tail. Sexes similar in both plumage and size, female barely even averaging larger; juvenile distinguishable; as adult by six to seven years.

**PERCHED Adult** Mainly very pale buff above to creamy-white below, with blackish flight-feathers and tail, neat buff-white downy ruff, and row of dark marks along greater coverts; blue skin of crown and back of head covered with short, sparse whitish down (sometimes bloody or grey with dirt), but face and neck mainly bare; yellow eyes and blackish legs; two small bare blue spots at basal neck-sides. **Juvenile** Much darker, but still relatively pale brown body, edged buff above and more streaked below, with straggly streaky-brown ruff; reddish skin of head and neck more extensively covered with whitish down, but face and lower neck bare; eyes brown; two small bare reddish spots at basal neck-sides. **Immature** Juvenile starts moulting at 10–12 months, and thereafter continuously with mixed age-plumages until adult at six to



some 2–4% larger and up to c7% heavier; juvenile and young immature distinct; much as adult by cfourth year, fully so by six to seven years.

**PERCHED Adult** Dull dark brown with barely darker flight-feathers, and blackish chin and throat, but contrastingly paler greyish-white to brownish-grey or buff-brown downy head with somewhat darker brow and variably dark area below eye, and brown ruff of long dense plumes from wing-base up to neck-side and nape; bare neck greyish-pink to blue-white; older birds palest-headed, and with faded underparts showing some paler streaks on breast. **Juvenile** Essentially dark brownish-black all over, including ruff and down-covered head, against which pale cere, bill-base and short eyebrow stand out. **Immature** Much as juvenile until first summer, and even then differs only in variably paler downy head; gradually becomes browner, less black, and paler-headed over cfour years, with upperwing-coverts generally browner and more contrasting from third winter. **Subadult** From fourth winter onwards, differs from adult only in darker-looking head, this gradually paling. **Bare parts** Eyes dark brown. Adult cere, bill-base and orbital rings pale blue to mauve, juvenile whitish to pinkish or violet-pink, turning bluer from cfourth year. Adult legs and feet variably bluish-grey to pale yellow or pinkish, juvenile yellowish to violet or pinkish-grey, even bluish-pink, gradually turning pinker or more yellow.

**FLIGHT** Huge dark raptor with big, powerful protruding bill on comparatively smallish-looking head, long and broad parallel-edged wings with serrated trailing edges (irregular on adult, very even on juvenile) and usually seven very deep and well-spread fingers, and short wedge-shaped tail (more rounded with wear) about half length of wing-base; wingspan 2.5 times total length. Slow, buoyant flight with deep, rather heavy beats in which downstroke more emphatic; soars on flat or barely arched wings with hands slightly depressed; glides on flat wings with hands drooped, often obvious kink at carpal joints, and with body and head hanging ponderously; tail often raised before landing. **Adult** In all but close view looks entirely dark, unless pale crown and bill visible; at closer range sometimes slight contrast of blacker flight-feathers and tail above, while below, where pale feet usually obvious, blackish chin and throat often stand out against browner underbody, though blackish wing-linings hardly darker than rest of underwing but usually with diffusely paler bands along bases of median and greater coverts; oldest birds show greatest contrast, with faded brown upperparts and underparts, latter with paler streaking on breast. **Juvenile** Essentially black-looking plumage relieved only by pale bare areas on head (cere, bill-base, around eye) and pale feet; in close view and favourable light, upperwing-coverts marginally browner, less black, or greater darkest and paler-tipped, and underwing-coverts little darker than flight-feathers below (sometimes paler band along greater). **Immature** Adult features gradually acquired over c six years, but little different from juvenile in first two years, except for some newly moulted inner primaries; by third winter upperparts browner-looking and wing moult well advanced (only some very worn middle secondaries still juvenile); much as adult by fourth winter, apart from somewhat darker head and bill and more uniform underparts with no hint of chest-streaking.

**CONFUSION SPECIES** Largest vulture in Old World, where should be fairly easily separated from almost all other raptors by combination of size, proportions and black or blackish plumage. But Lappet-faced Vulture [64] barely smaller, and often looks at least as big, so care needed in small area of possible range overlap in south Middle East: Lappet-faced best separated by more bulging arms in flight, bare pinkish or reddish head, somewhat paler plumage with more variegated underbody mottled or blotched paler and usually distinctly paler crissum. Several *Cyp*s vultures could cause problems in Asia, in particular juveniles of White-rumped and Himalayan [56, 60] (former smaller, streaky underbody, wing-linings with much white, latter streaked above and below, both with one to two clearer whitish lines on underwing-coverts, soar with wings in shallow V); Griffon Vulture [61] often said to be likely confusion, but not really that similar (bulging arms broader than hands, shorter squarer tail, smaller paler head, distinct and obvious plumage contrasts both above and below, soars and glides with wings usually in shallow V). Dark-plumaged juveniles of Egyptian Vulture [54] (clearly much smaller, narrower-winged, longer tail) and Lammergeier [53] (slimmer wings with narrower hands, much longer tail) unlikely to cause problem. Otherwise, juvenile and immature White-tailed Fish-eagle [48] a potential pitfall (smaller size, fully feathered head far more projecting, wings more pinched in at base, tail more distinctly wedged, streaky underbody, pale arm-pits, rectrices normally with at least some white). In fact, flight silhouette of Monk in some respects closer to *Aquila* eagle, especially adult Steppe Eagle [221], but that species smaller and proportions still different enough to preclude confusion (Steppe, as well as similar Greater Spotted Eagle [219], comparatively shorter-winged without saw edges, longer-tailed, more obvious head in flight, yellow bare parts, also several plumage differences e.g. pale markings above on primary bases); adult Imperial Eagle [222] similarly separated from Monk by smaller size and shape (proportionately narrower wings, longer and squarer-tipped tail, well protruding head, as well as paler crissum, conspicuously paler crown/nape).

**VOICE** Generally silent, with few vocalisations and none conspicuous. Various sounds noted at times at food sources include low croaks, grunts and hisses; and around nest, and during copulation, also mews and hisses. Occasional high *gli gli gli* when nervous or in anxiety.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs, far more so than most vultures, though occasionally in small groups at food or at roosts, seldom more than a dozen together, but older records of up to 50 at carcass; solitary breeder, too, but normally in very loose colonies or nuclei, with pairs 30 m to 2 km apart, and once even 45 pairs with inter-nest distances 100–400 m. Mutual high-circling with synchronous movements by pair-members, often close together, is commonest aerial display; flight-play also not unusual, upper bird dangling legs and lower sometimes rolling over and interlocking talons, the two then dropping 100 m or so in cartwheeling descent. Intruding conspecifics engaged by territory-owner, ensuing talon-locking and similar or more prolonged downward spiral then easily confused by observer with courtship display.

**BREEDING** February–August/September. Massive stick structure up to 1.5–2 m across and 1–3 m deep, decorated with dung and animal skins, 1.5–12 m (mostly 2–8 m) up in tree such as oak, juniper or pine or other conifer (in Uzbekistan often almond *Amygdalus bucharica*), and typically one growing out of cliff; rarely in Europe, but not infrequently in Asia, on ground on rock or cliff. Clutch 1 (exceptionally 2). Incubation 54–56 (50–62) days. Fledging 104–120 days, reportedly slightly shorter (95–110 days) in southwest Europe; dependence possibly 2+ months.

**POPULATION** Has undoubtedly declined during 20th century, especially in post-war years, and no longer breeds in many formerly occupied parts of West Palearctic, such as Portugal, Italy, Austria, Slovakia, southern Poland, former Yugoslavia, Albania, Romania, Moldova and Israel, while range generally has contracted. In Europe, populations outside Spain either very small or tiny, with largest in Greece, where 80–90 birds in 1994 included 20+ pairs, and estimated 30–50 pairs in south European Russia; only 1–2 pairs in Bulgaria, 3–6 in Crimea (from c20 in 1950s), total of c90 pairs plus some 100 non-breeders in Caucasus (c20 pairs in each of Georgia and Armenia, 40 in Azerbaijan), while Turkish population estimated at 100–500 pairs and probably not much above 200. Spanish population had declined to 200 pairs by 1970s but, with protection of core breeding areas coupled with ban on use of poisons and increased public awareness, recovered rapidly to 900–1,000 in 1992; in 1994 1,027 pairs were counted and by the end of the 20th century the total was thought possibly to be as high as 1,150. Re-establishment programme in Mallorca from 1966, when only c20 individuals survived there, had raised numbers to 57 in 1991, but no more than ten pairs thought to be breeding at end of the century; nine birds released in south France in 1992 and 1993 led to four pairs breeding by 1997. Few figures available for Asiatic part of range, which must cover at least 6.5 million km<sup>2</sup> and where scattered data on densities range from 1.7–2 pairs/10 km<sup>2</sup> in Uzbekistan to 5 pairs in 100 km<sup>2</sup> in Mongolia; but this species tends to nest in breeding nuclei in undisturbed and widely scattered core areas, so such figures cannot be applied to whole range. Published estimate of probably 1,000+ pairs in Asiatic part of former USSR seems perhaps overoptimistic and yet a far more precise figure of 1,760 pairs has been published for China and this vulture is said to be 'common' in Mongolia. On these bases a total of perhaps 3,000–3,500 pairs might not unreasonably be expected in Asia and that, combined with some 1,500 pairs in Europe, would give a world figure at the start of the 21st century of 4,500–5,000 pairs. Thus, with immatures and other non-breeders added, whole pop-

ulation is likely to be well into, but at the low end of, the five figure range. Main causes of decline appear to have been habitat alteration and disturbance, including destruction of forest, while direct persecution, poisoning (deliberate or accidental) and a lack of sufficient food are also implicated; even where traditionally protected, as in Tibet, use of rodenticides has had serious impact on this and other carrion-eaters, and elsewhere in Asia further problems result from trapping or shooting for the feather trade, while this species's tree-nesting habit also makes it vulnerable to human interference. Its future prospects could be improved greatly by establishment of extensive protected areas in regions where plentiful livestock and wild ungulates, as so successfully done in Spain, together with provision, where necessary, of feeding stations.

**GEOGRAPHICAL VARIATION** Monotypic. Size increases west to east (e.g. nine Chinese specimens have wings 801–887 mm, as against 730–807 mm in sample from south Europe), and Chinese and Mongolian populations have been separated as '*chinou*' (or '*chinou*') and '*danieli*' respectively on basis of their greater sizes, but wide overlap occurs and increase in average measurements distinctly clinal. Racial separation therefore unwarranted.

**MEASUREMENTS** ♂ wing 730–820 mm, ♀ 750–887 mm, sexes combined 740–845 mm (southeast Europe, Turkey), 780–854 mm (west Asia), 790–819 mm (Tibet and China); ♂♀ tail 330–410 mm (♀ averages larger); ♂ tarsus 120–143 mm, ♀ 124–138 mm. **Weights** ♂ 7–11.5 kg, ♀ 7.5–12.5 kg.

**REFERENCES** Akimov (1940), Beaman & Madge (1998), Berger (1987), Bernis (1966a), BirdLife International (2000), Brown *et al.* (1982), Cheng Tso-hsin (1987), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Donazar (1993), Elösügu (1970, 1971), Esquivias *et al.* (1980), Etchécopar & Hüc (1978), Faust (1964), Fischer W (1974), Flint *et al.* (1984), Forsman (1999), Geplikman (1959), Gensbol (1986, 1995), Geroudet & Grubler (1967), Glutz von Blotzheim *et al.* (1971), González (1991b), Grimmett *et al.* (1998), Hagemeijer & Blair (1997), Handrinos & Akrotis (1997), Handrinos & Demetropoulos (1985), Heredia (1995, 1996), Hiraldo (1974, 1976, 1983), Jankov *et al.* (1994a, 1995), Inskipp & Inskipp (1991), Kemp & Kemp (1998), Korshonov & Korshunova (1985), Mayol (1975, 1977a), Meier (1982), Meyburg (1976, 1989b), Meyburg & Meyburg (1983, 1984), Minnemann & Busse (1984), Mundy *et al.* (1992), Porter *et al.* (1981, 1996), Reise (1997), Richford (1976), Richford & Platt (1982), Richford & Stewart (1975), Roberts (1991), Rogacheva (1992), Shirihai (1996), Shirihai & Christie (1992), Shirihai *et al.* (1996), Suárez (1973), Suerens & van Groenendael (1966, 1967), Svensson *et al.* (1999), Tewes (1994), Valverde (1966), Waters & Prytherch (1968), Ye Xiao-Ti (1991).

## 64 LAPPET-FACED VULTURE

*Aegypius tracheliotus* (JR Forster, 1795)

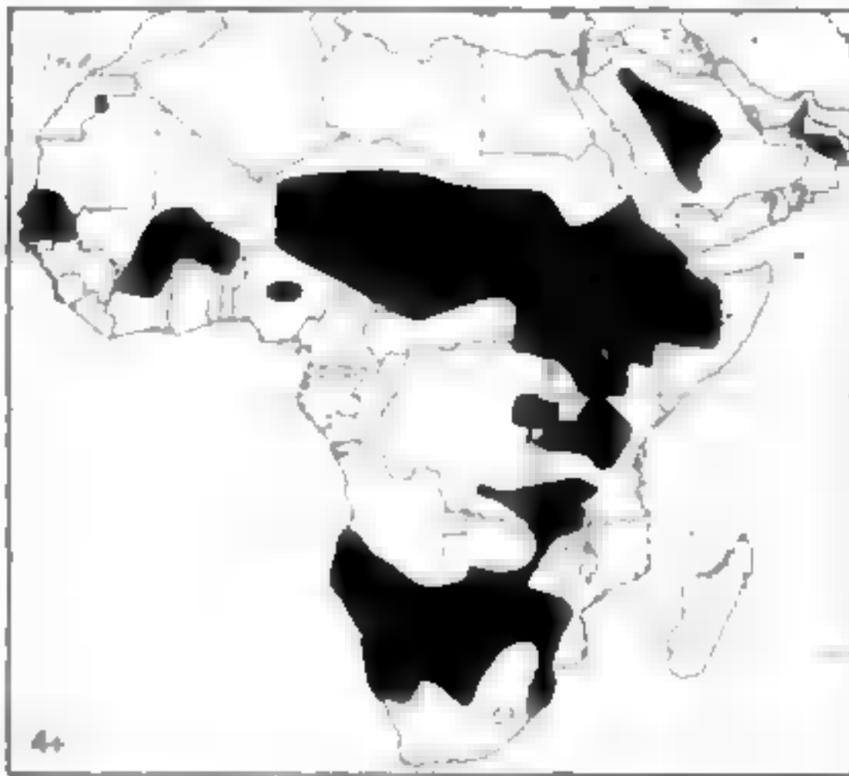
Plate 23

Other names: African Black/King Vulture, Nubian Vulture

**DISTRIBUTION** Afrotropical and marginally Palearctic (30°N to 30°S); order 4+; though widespread and not

uncommon over considerable areas, has withdrawn from many parts of former range and in others continues to decrease, notably in Sahel and southern Africa, and rare in western and northern outposts. Now restricted to

Africa and Arabia: in Africa, breeds or is resident in Senegal, Mali, Burkina Faso, Niger, Chad, Sudan, southeast Egypt, Ethiopia, Somalia, Kenya, Tanzania, Uganda, Rwanda, easternmost DR Congo, Zambia, Malawi, Mozambique, Swaziland, northeast South Africa, Zimbabwe, Botswana and Namibia (thus mainly along southern Sahara into Sahel, down through East Africa and across northern two-thirds of southern Africa, but not in former or existing forest areas of West and Central Africa); possibly still in Mauritania and Nigeria, also occurring in The Gambia, northern parts of Guinea, Ivory Coast, Benin and Central African Republic, as well as southern Angola; in Arabia, increasing (or increasingly discovered in 1990s) in interior Saudi, also Yemen, Oman and United Arab Emirates. Formerly bred or probably bred also in Western Sahara (last recorded 1955), Atlas Mountains (Algeria, perhaps to 1930s in Morocco, where two also seen 1972), southern Tunisia (to 1930s) and Israel (until 1989, three birds remaining until 1994).



**MOVEMENTS** Often sedentary, but even adults nomadic at times. Some dispersal in Chad and West Africa during rains, June–September. Foraging takes place over considerable distances: Israeli population known to feed up to 150+ km north of breeding area. Immatures dispersive; several colour-ringed in Namib Desert recorded at distances of 120–700 km; also over 800 km from northeast South Africa to Zambia. Vagrants recorded in last 50 years in Morocco, southern Libya, Jordan (possibly bred), Spain and, in 19th century, south France.

**HABITAT** Dry savannah, thornbush, arid plains, desert with scattered trees in wadis, open mountain slopes. Prefers undisturbed open country with some trees and little or no grass, but will forage in areas with denser cover or where some human disturbance (e.g. roadsides). Sea-level to 3,000 m, locally to 4,500 m.

**FIELD CHARACTERS** Huge bulky vulture, as adult mostly blackish with white thighs, with massive bill (approaching 10 cm long and 5 cm deep), variably distinct fleshy folds ('lappets') on bare head and neck, short dense ruff on rear neck and elongated feathers to sides and below thinly covering short white down, plain downy thighs. Perches on trees with head up or stands on ground with upright haughty stance; long wings about equal to shortish tail; walks easily and occasionally

dashes or leaps forward to cause chaos in vulture throng. Sexes similar (and partial albinos also recorded), but female averages 2% larger and, judging from overweight captive birds, over 50% heavier; juvenile distinguishable; as adult after six to seven years.

**PERCHED Adult** Varies from mainly black above with thin brown edges (sub-Saharan Africa) to dull blackish-brown with blacker flight-feathers and tail (Arabia); and, similarly, pure white to buff or brown below, all downy and, except on thighs, streakily overlaid with long lanceolate blackish feathers; in southern Africa, head bare and dull red (blushing to scarlet in excitement) with purple jawline, pale blue cere and mainly yellow bill, but farther north the bill is mostly blackish and, in northeast Africa, the head duller pink with reduced lappets, while in Arabia pink is confined to rear crown, face greyish, head more downy and lappets reduced. **Juvenile** All brown with rufous edges above and longer erectile ruff; head almost bare and pale pink in southern Africa, but grey-white with, at most, faint pink tinge and variously covered in buff-white down in Arabia. Towards end of first year bill already turning yellow and facial skin able to flush scarlet. **Immature** Juvenile starts moulting at around one year, and thereafter continuously with mixed age-plumages until adult at six to seven years. Plumage becomes more blackish-brown and white in Africa in second year, including whitish down on chest and thinning-out of breast feathers to reveal more underlying down; mantle and wings variably dappled with white for several years. Best guide to ageing (except in northeast Africa and Arabia) is amount of white on trousers: little white late in second year, half white by fourth, all white in fifth or sixth. **Bare parts** Eyes dark brown. Adult bill pale yellow-horn or greenish-brown to blackish, juvenile blackish-horn to yellowish-grey. Cere pale blue to pale grey-blue, duller on juvenile. Bare skin of adult head pink to purplish-pink, with bluer cheeks, flushing scarlet and purple-blue in excitement; juvenile pale pink (variably covered in down). Adult feet pale blue to blue-grey, juvenile grey-brown.

**FLIGHT** Huge raptor with long broad wings with fairly parallel edges and noticeably pointed tips to secondaries ('saw-toothed'), shortish and slightly wedge-shaped tail (may become rounded or squared through wear), heavy-looking head and neck; wingspan 2.6 times total length. Takes off and lands on ground surprisingly easily for its size and bulk; glides on flat wings less angled back than those of other large vultures; also soars on flatish wings. **Adult** All dark above except for paler head (but some contrast between browner forewings and blacker flight-feathers in northeast); from below, white patagial band and white thighs distinctive over much of range, but these brown and white or all brownish in northeast Africa and Arabia, when other points include streaky underparts with whitish or buff patches at chest-sides and greyer secondaries paler than wing-linings and black wing-tips. **Juvenile** All brown with only slightest suggestion of patagial bar and chest streaking from below. **Immature** Identification becomes easier in subsequent stages as contrasts begin to develop.

**CONFUSION SPECIES** Adult almost unmistakable, particularly in sub-Saharan Africa, but at great height overhead, when size cannot be judged, slight possibility of confusion with far smaller Hooded Vulture [55]

(whitish areas around chest and thighs, but no patagial bar and thin head). Juvenile, however, more difficult: even when settled, at great distance, confusion possible in sub-Saharan Africa with juvenile Hooded Vulture (far smaller, with thin bill, brown down on hindneck) and juvenile White-headed [65] (considerably smaller, with red bill, brown down on back of head, pink feet). Can also be confused with these in distant flight, small Hooded purely because of pattern and shape, but White-headed distinguished by whitish band along greater coverts. Might also conceivably be confused in flight with lone juveniles of *Gyps* vultures: White-backed [57] in much of Africa, Rüppell's [59] in north tropics or Griffon [61] in Middle East, but all these have different wing shape (more bulging primaries) and less uniform wing-linings with individual patterns. Much more likely in Egypt, Middle East and Arabia is confusion of browner and less strikingly marked birds with Monk Vulture [63]: Monk more uniformly blacker on ground, with much darker head, but, though adult can also be distinguished in flight from juvenile Lappet-faced by flight-feathers darker than wing-linings and separated by paler brownish band, juvenile Monk has linings darker, no markings and even similar serrated trailing wing-edges; almost only distinctions if head cannot clearly be seen are blacker coloration (not always easy at distance in strong lights), slightly bulging secondaries and, in gliding, more bowed and angled wings of Monk.

**VOICE** Almost invariably silent, but occasionally fast high-pitched chatter, amounting to 'shriek' or 'yelp', from bird dominated by another at carcass.

**FOOD** Carrion; also some bird eggs, apparently some live vertebrate prey. The one African vulture able to tear skin of larger mammals and, perhaps because it is prone to search rather than watch other scavengers, often arrives early at carcasses; as result, frequently credited with the function of breaking in through coarse skin. But only rather incidentally does this or takes strips of meat; instead, even though dominant over other vultures, tends to hang around edge of throng (at carcasses varying in size from antelopes to elephants, or from sheep and goats to cattle and camels) and concentrate later on the remnant skin, tendons and other coarse tissues. Full crop may contain up to 1.45 kg of meat. Often also feeds on smaller mammals, birds and reptiles (monitors and other lizards), probably as result of low, slow search flight; some are clearly natural deaths or roadkills, but Mundy *et al.* believe that others are pirated prey forced from eagles or even killed by the vulture itself. In latter case, probably still-hunts from tree perch, dropping on to small animals, stunning by impact and tearing with bill. No eyewitness accounts of such predation, but recorded killing adult and young flamingos at colonies (also eating eggs) and flushed from freshly dead gazelle fawns and guineafowl (which may, of course, have been killed by another predator); also, majority of prey items at nests are smaller animals. Feeds on wildebeest and other antelope placentae, perhaps also weak or dying fawns, but normally forages over home range rather than following migratory herds; recorded taking stranded fish and terrapin eggs.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary: pairs breed singly; at carcasses, often only one or two, or at

most about ten, but where common occasionally 25–50 at large food sources or waterholes. Courtship flights almost unknown: pair-members may soar in unison, but this likely to be territorial activity.

**BREEDING** November–July/September in north of range, throughout year in different parts of East Africa, and May–January in southern Africa. Huge flat nest of sticks, 120–220 cm across and 30–70 cm deep, lined with grass, later with hair and skin, at 3–15 m on top of acacia or other low tree. Clutch 1 (1–2). Incubation 54–56 days. Fledging 125–135 days, with dependence regularly as much as 12 months or more. There is also a remarkable record of a Lappet-faced hatching and rearing a White-headed Vulture [65] in the wild (Anthony *et al.*).

**POPULATION** Now classified as vulnerable. Mundy *et al.* gave South African total of only 100 pairs and suggested that southern Africa (south of Okavango-Zambezi) and East Africa possibly each hold 1,000 pairs and 1,000 immatures, and West Africa and the Sahara perhaps half those numbers, indicating an African total that may be only around 8,000 birds scattered over 8 million km<sup>2</sup>; to this figure must be added about 500 in interior Saudi Arabia and small numbers elsewhere on the Arabian Peninsula. Increased disturbance (varying from spread of cultivation to growth of motorised transport), pesticides, shooting and, in southern Africa, use of strychnine and other poisons in carcasses are likely major factors in continuing decline. There these largest of Afrotropical vultures are poisoned in this way because it is assumed, mistakenly, that they kill cattle and other livestock: one such incident in Namibia poisoned 86.

**GEOGRAPHICAL VARIATION** Often treated as monotypic, though *nubicus* (northeast Africa) sometimes separated on browner plumage, partly brownish thighs, paler head and less developed lappets; but relatively recent understanding of more distinct Arabian population now indicates that the species is best treated as comprising two races, with *nubicus* representing a somewhat intermediate stage in a cline of decreasing colour and contrast from south to northeast.

*A. t. tracheliotus* (Africa) Very black, with white thighs and patagial line, bald red head, large lappets, yellow (in south) or black bill.

*A. t. negrensis* (Arabia, Israel) Altogether browner, including partly brown thighs and brown patagial line, downy greyish and pink head, blackish bill (comparable to retarded immature stage in sub-Saharan Africa).

**MEASUREMENTS** ♂ wing 715–795 mm, ♀ 755–825 mm; ♂ tail 330–375 mm, ♀ 335–360 mm; ♂ tarsus 122–150 mm, ♀ 134–143 mm. **Weights** 5.4–9.4 kg, averaging only 6.2 kg in East Africa (but captive *negrensis* ♂ 6.5–9.2 kg, ♀ 10.5–13.9 kg).

**REFERENCES** Anthony (1976), Anthony *et al.* (1986), Bannerinan (1955), Barnes (2000), Benson & Benson (1975), Bergier (1987), BirdLife International (2000), Brown (1986b), Brown *et al.* (1982), Bruun (1981), Bruun *et al.* (1981), Clark & Leshem (1988), Clark & Schmitt (1999), Cramp & Simmons (1980), Evans & Al-Mashaqbah (1996), Forsman (1999), Gensbol (1986, 1995), Gin *et al.* (1989), Goodman *et al.* (1989), Harrison *et al.* (1997), Herholdt & de Villiers (1989), Houston (1989), Hustler & Howells (1988a), Jennings (1982), Kruuk (1967), Leshem (1984), Massa (1999), Mendelsohn & Marder

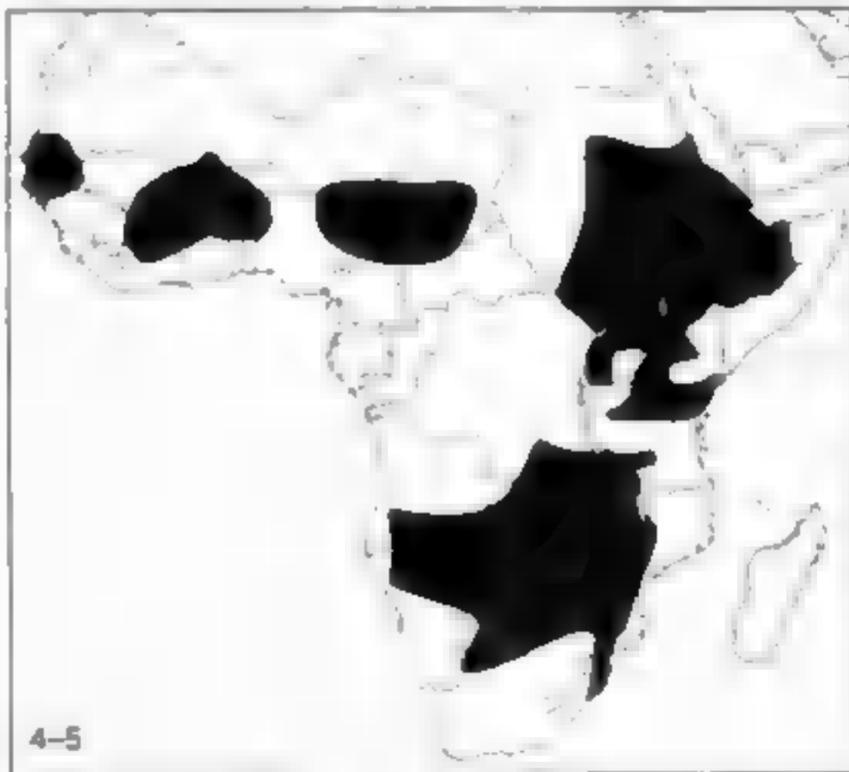
(1984, 1989), Mundy (1982), Mundy *et al.* (1992), Newton & Shobrak (1993), Pennycuik (1976), Pickford *et al.* (1989), Richardson (1990), Shirihai (1996), Shirihai & Yakutiel

(1991), Simmons (1995), Steyn (1982), Tarboton & Allan (1984), Weigelt & Schultz (1992), Wilson (1982).

## 65 WHITE-HEADED VULTURE *Aegypius occipitalis* (Burchell, 1824)

Plate 23

**DISTRIBUTION** Afrotropical (17°N to 29°S); order 4-5; widespread but generally scarce to uncommon. Endemic to sub-Saharan Africa: Senegambia and Guinea-Bissau, and from southern Mali, Upper Volta and northern Ivory Coast eastwards to southern Sudan, Ethiopia (including Dahlaks) and western Somalia, thence south through East Africa to Zimbabwe, southern Angola, northern Namibia and Botswana, easternmost South Africa and Swaziland.



**MOVEMENTS** Adults apparently sedentary, perhaps more so than any other African vulture, immatures more nomadic: one ringed recorded 117 km away. Some indication of movement with rains by immatures in West Africa and Chad.

**HABITAT** Savannah, thornbush and lightly wooded grassland, but also forages in completely open country, including subdesert, and at times enters quite dense woodland. Sea-level to 4,000 m.

**FIELD CHARACTERS** Mid-sized, chunky, arrogant-looking vulture, blackish and white as adult, with heavy, strongly hooked (and colourful) bill, rear-peaked head, short neck, high-backed ruff, downy thighs; long wings just exceed tail. Sexes similar, except for unusual dimorphism in wing pattern, but female averages 2% larger and 17% heavier; juvenile distinguishable; as adult after six to seven years.

**PERCHED** **Adult male** Blackish above, including ruff, but with buff-edged wing-coverts and dark grey inner secondaries; black breast strikingly separates white downy head and crop area from white abdomen and downy thighs; bright orange-red bill, pale blue cere, and pale pink face and throat which flushed red in excitement. **Adult female** Differs in having white inner secondaries (see fig. 30). **Juvenile** Largely dark brown, including

crop, with faint buff scaling on wing-coverts, but colours of bill, cere and face only slightly duller than adult's; down on head at first mixture of white and brown, but becomes wholly brown after few weeks. **Immature** Juvenile starts moulting at 12-13 months, and thereafter continuously with mixed age-plumages until six to seven years. By second year, inner secondaries already white on female, but remain blackish on male; white mottling starts to reappear on head, and to show on crop area, abdomen and inner thighs; and wing-coverts become more variegated. This process continues gradually, the brown on head soon becoming confined to an occipital skullcap, but probably not fully adult before six to seven years. **Bare parts** Adult eyes yellow, juvenile blackish-brown. Bill bright orange-red and cere pale blue, both only slightly duller on juvenile. Bare skin of face pink, flushing red. Adult feet bright pink, juvenile pinkish-brown. **FLIGHT** Large raptor with long broad wings, shortish wedge-shaped tail (may become rounded or squared through wear), heavy-looking head and neck. Takes off and lands on ground more easily than larger vultures; glides and soars on flat wings. **Adult male** Mainly dark above apart from white head and patterned wing-coverts; but strikingly contrasted below by white crop area, abdomen, thighs and band along greater coverts (also some white feather-bases showing through on underwing-coverts, variably suggesting mid-lining bar, and pink throat). **Adult female** Contrast is made more striking, both above and below, by startling white inner secondaries (see fig. 30). **Juvenile** All-brown juvenile also has white line along rear edge of wing-linings, but thinner and less clear. **Immature** Mainly brown birds with white inner secondaries are second-year females, and adult's white patterning emerges gradually thereafter.

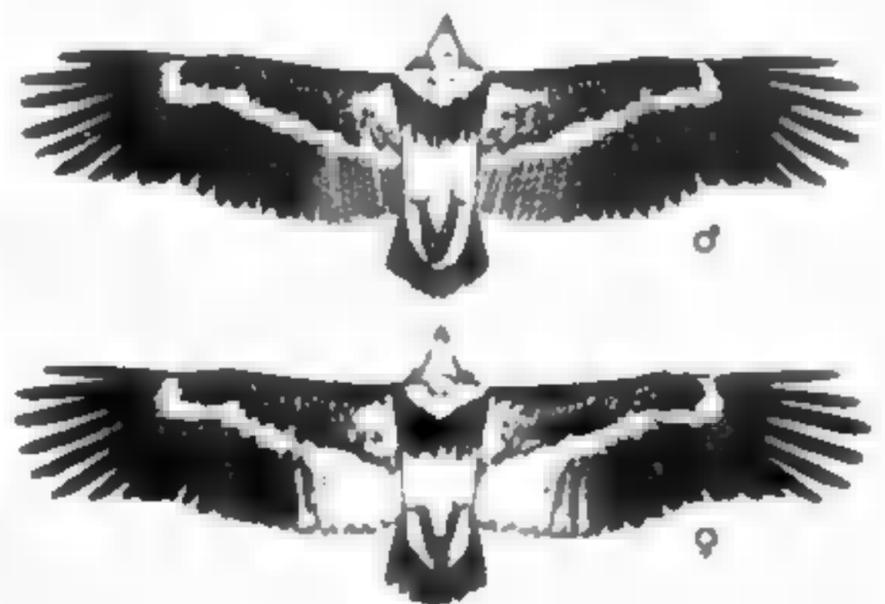


Fig. 30. Adult White-headed Vulture *Aegypius occipitalis* (65) in flight from below, showing difference in colour of inner secondaries: grey on male (upper), contrastingly white on female.

**CONFUSION SPECIES** Adults unmistakable. But for coloured bill and cere, juvenile not unlike juvenile Lappet-faced Vulture [64] (clearly larger, with massive dark bill, all-whitish down on wrinkled head and neck, pale grey feet). In flight from below, when size not obvious, whitish edge to wing-linings distinguishes from all-dark juvenile Lappet-faced, and also from Hooded Vulture [55] (much smaller, but similar outline and colour).

**VOICE** Almost invariably silent, but rarely chatters when competing with other vultures and scavengers at carcasses.

**FOOD** Mainly carrion; also eggs, birds, insects, possibly small mammals. Carrion varied: large mammal carcasses or, very often, smaller dead mammals and reptiles, road-kills, pieces of skin and other animal scraps. Also takes flamingo eggs, insects (termites, locusts) on ground, and stranded fish and amphibians from drying pools. Occasionally pirates food from Marabou Storks *Leptoptilos crumeniferus* and even other raptors to size of African Fish-eagle [44]. Kills young flamingos and suspected, without proof, of killing various small mammals (hares, antelope calves, also mongoose, serval), reptiles (monitors, puff-adder, python), and terrestrial birds (especially guinea-fowl). Immatures and, to lesser extent, adults often among first scavengers to arrive at carcasses, along with immature Bateleurs [73], but have to give way to larger Lappet-faced [64] and hordes of commoner vultures, then hanging about at edge of melee to pick up scraps.

**SOCIOSEXUAL BEHAVIOUR** Rather solitary; normally breeds as single pairs; up to eight at carcasses; otherwise, sometimes one adult and one immature together. Pair-members soar and circle in unison over breeding area, and roost together on or near nest-tree well before laying.

**BREEDING** October–November–May in West Africa, October–June in Ethiopia and Somalia, throughout year

in different parts East Africa, May–January in southern Africa. Usually large flat or rather deep nest of sticks, 80–170 cm across and 20–60 cm deep, lined with grass and hair, at 5–20+ m, often conspicuously on crown of acacia, baobab or other often flat-topped tree, in Zimbabwe (Hwange NP) preferably *Adansonia* or *Terminalia*. Clutch 1. Incubation 51–56 days. Fledging 110–120 days. There is also a remarkable record of a White-headed being hatched and reared by Lappet-faced Vultures [64] in the wild (Anthony *et al.*).

**POPULATION** Densities low: road counts gave only 0.25–1.2 birds/100 km, with maximum of up to 9.3/100 km in Uganda and Cameroon. Mundy *et al.* estimated c150 pairs in South Africa, 500 pairs in southern Africa north to Okavango and Zambezi, and possible continental population of 7,000–12,500 birds. Up to 61% each year do not attempt to breed, especially in years of below-average rainfall. Decline, most marked in southern Africa (where now confined to reserve areas), due perhaps to combination of poisoned baits put out for small carnivores and removal of small animals' grass cover through overgrazing by cattle; direct human disturbance and pesticides may be contributory factors.

**GEOGRAPHICAL VARIATION** Monotypic, but some suggestion of cline of increasing size from West African lowlands to eastern and southern highlands.

**MEASUREMENTS** ♂ wing 610–660 mm, tail 265–295 mm, tarsus 95–110 mm. **Weights** 3.3–5.5 kg.

**REFERENCES** Anthony *et al.* (1980), Bannerman (1983), Benson & Benson (1975), Brooke (1984), Brown *et al.* (1982), Ginn *et al.* (1989), Gize (1990), Grimes (1987), Houston (1989), Howells & Hustler (1984), Hustler & Howells (1988b), Kemp & Kemp (1998), Koenig (1979), Kruck (1967), Maclean (1993), Mundy (1982, 1985, 1987), Mundy *et al.* (1992), Pennycuik (1976), Pinto (1983), Steyn (1982), Tarboton & Allen (1984), Thiollay (1978b) *et al.*

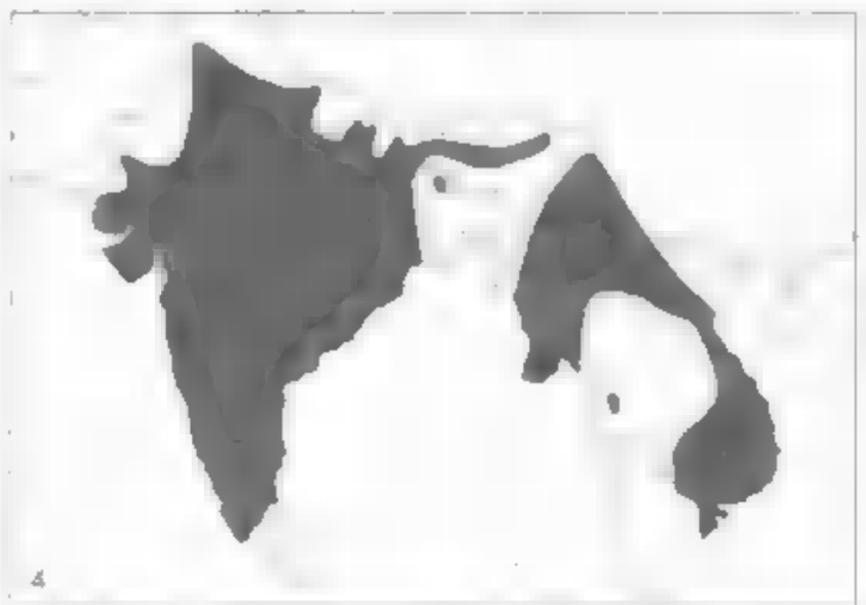
## 66 RED-HEADED VULTURE *Aegypius calvus* (Scopoli, 1786)

Plate 21

Other names: Indian or Asian Black or King Vulture, Pondicherry Vulture

**DISTRIBUTION** Indomalayan (c33°N to c10°N); order 4; locally still perhaps fairly common, but now scarce, rare or extinct in many parts of traditional range. Indian subcontinent and southeast Asia: eastern Pakistan (now only rare straggler), India (still locally common in west Himalayan foothills, but now scarce in many other areas, rare or extinct in Gujarat and northeast, extinct in extreme south), Nepal (was fairly common, but becoming scarce), Bhutan, Bangladesh (formerly common, now rare in northwest, extinct elsewhere), Burma (formerly common, now rare), southwest China (south Yunnan only, very rare), Thailand (formerly locally common, now very rare and only in remote northwest), northern peninsular Malaysia (once locally common, now extinct) and parts of Laos, Cambodia and Vietnam (formerly common, now rare and restricted to region where the three countries meet).

**MOVEMENTS** In general sedentary, but individuals forage over considerable areas, some seasonal altitudinal movements, for example in Nepal; immatures perhaps more nomadic.



**HABITAT** Wide spectrum ranging from dry forest, dense deciduous woodland and wooded savannah through open plains and cultivation to semi-desert, in both lowlands and foothills, and including river valleys, coasts and vicinity of villages. Sea-level to 1,500 m, locally to 2,500 m (and reported at up to 3,000+ m).

**FIELD CHARACTERS** Medium-sized and fairly bulky vulture, mostly black when adult but for coloured bare head and legs, with deep bill, peaked rear crown, lateral face-wattles, smallish feathery ruff, long wings, short tail. Perches openly on trees, less often on cliffs or buildings, and waddles with rolling gait on ground; wing-tips cover tail. Sexes similar, except eye colour, and female perhaps averages only c1% larger; juvenile distinct but remains much the same until third year, after which becomes more like adult over next two(?) years.

**PERCHED Adult** Predominantly black, including hind-ruff, but browner on bases of secondaries as well as on lower back and rump, white strip across chest at base of neck, oval white patches at tops of thighs, and more or less red head and legs (see 'Bare parts'). **Juvenile** Paler head, with white down on crown extending to patches on throat and sides of neck; no wattles, just loose flaps of skin; otherwise medium brown above, looking scaled by thin pale edges in fresh plumage, but blacker flight-feathers and tail; lighter brown below, with white on crop, lower flanks, upper and inner thighs, and lower belly to crissum. **Second/third-year** Apparently still much like juvenile, but less white down on head, wattles developing. **Fourth-year onwards** Increasingly like adult, with bare head and full wattles. **Bare parts** Adult eyes yellowish-white to yellow (male) or red-brown to dark red (female), juvenile brown to red-brown. Adult cere (contrasting with dark brown bill) and head deep yellowish-red or orange-red with redder wattles (all becoming rich red in excitement), juvenile greyish-pink and later redder. Adult legs dull red, juvenile more flesh-coloured.

**FLIGHT** Large raptor with small head protrusion, long and relatively slim wings broadest at base and narrowing towards moderately fingered tips (narrowing less obvious on juvenile, whose outline closer to *Gyps* [56, 58]), and slightly wedge-shaped tail (can look rounded with wear); wingspan 2.6 times total length, tail much shorter than wing-base. Rises comparatively easily from ground with few slow, deep beats; glides on level wings with hands bowed at carpal joints; soars with wings only slightly raised in very shallow V. **Adult** Apart from more or less red head, mainly black above, but browner bases to secondaries produce pale mid-wing panels, while browner lower back may even look whitish in some lights; below, black body and wing-linings with white patches at base of neck and on thighs, though these often less obvious at greater ranges than grey-white diagonal strip along bases of darker-tipped secondaries; red feet show against black crissum. **Juvenile** Brown above, with white on crown and, again, dull whitish area on lower back; brown below, with white or whitish patches corresponding to adult's at base of neck and on upper thighs and, in addition, diagnostic whitish lower belly and crissum; no pale panel on wings. **Immatures** See previous section.

**CONFUSION SPECIES** Combination of white patches on chest and thighs with grey-white underwing-panels

(adult) or whitish crissum (juvenile) makes species unmistakable at all ages, quite apart from red or reddish head and legs. But beware of confusing browner colour, whitish lower back and less tapered wing shape of juvenile with intermediate stages of immature White-rumped Vulture [56]; may be found singly with feeding, roosting or nesting groups of both that species and Long-billed [58].

**VOICE** Mostly silent. 'Squeaks, hisses and grunts like other vultures'. Hoarse croak extended into 'sort of scream' when quarrelling at carcass, and raucous 'roaring' during courtship and copulation.

**FOOD** Carrion, including small corpses. At large well-attended carcasses, tends to give way to White-rumped and Long-billed [56, 58], but recorded pirating food from Egyptian Vulture [54]. Swooping on wounded Greenshank *Tringa nebularia* reported. Forages by soaring, sometimes persistently over grass fires, where drops down periodically to pick up scorched animals.

**SOCIOSEXUAL BEHAVIOUR** Often solitary; though mixing with other vulture species, seldom gregarious; concentrations of up to 20-30 recorded in past. Aerial courtship includes extended bouts of circling, often wing to wing, combined with spectacular plunges, twists and talon-grappling, so much so that acrobatics have even been misinterpreted as aerial copulation.

**BREEDING** Pairs solitary and territorial, but sometimes breed with White-rumped Vultures [56]. December-September, most laying February-March. Initially small stick nest, 40-65 cm across and 15 cm deep, growing to as much as 1.5 m across and 1.2 m deep with repeated use, lined with straw, animal remains and rubbish; at 10-30 m in large tree, often in cultivation or other open country, sometimes in forest, or as low as 1-3 m on bush in semi-desert. Clutch 1. Incubation c45 days (Ali & Ripley). Fledging period not recorded.

**POPULATION** Traditional distribution took in more than 5 million km<sup>2</sup>, and in 1960s 'along the coast of Thailand and Indo-China [this] is the commonest of the vultures' (B&A). Now questionable whether range can be said to cover much more than half the original area, and species has become rare or extinct in much of southeast Asia, as well as in Pakistan, Bangladesh and southern peninsular India, and is declining even in other parts of India (e.g. Gujarat). While still perhaps reasonably common at local levels in India, this rather solitary vulture has the potential to become endangered. Total population now seems unlikely to exceed four figures. Declining carrion supplies and increased disturbance and persecution have been advanced as possible adverse factors, but in Bangladesh, for example, whereas White-rumped Vultures [56] remained locally common until late 1990s, status of Red-headed had changed from 'common resident' to 'apparently extinct' by early 1980s (Sarker & Sarker): how much of the Indian population is heading the same way? Relative timidity at carcasses may limit potential food, and red heads attracting attention may increase persecution, but other more specific factors must also be involved? The species' decline in southeast Asia may well have resulted from such causes as 'the demise of wild ungulates, the intensification of agriculture [and] increased sophistication of waste disposal techniques' (BirdLife International).

but, this being a bird which also favours wooded country, perhaps deforestation has both increased disturbance and destroyed too much habitat. Its decrease farther west appears unsynchronised with the declines of other vultures. In Keoladeo National Park, near Bharatpur, India, Pradash found that the resident population remained stable at 3–4 breeding pairs throughout the 1980s and 1990s, even when the numbers of *Gyps* vultures were crashing in the last part of the period (see Population under White-rumped [56]).

**GEOGRAPHICAL VARIATION** Monotypic. Often placed in monospecific genus *Sarogyps*, but has affinities

with three other monospecific genera which are combined here in *Aegypius*.

**MEASUREMENTS** ♂ wing 570–625 mm, tail 226–257 mm, tarsus 105–116 mm. **Weights** ♂♀ 3.7–5.4 kg.

**REFERENCES** Ali & Ripley (1978), BirdLife International (2000), Cheng Tso-huan (1987), Deignan (1945, 1963), Etcheopar & Hür (1978), Humphres & Bam (1980), Inskipp & Inskipp (1991), Khachar & Mundkur (1989), King *et al.* (1975), Lekagul & Round (1991), Medway & Wells (1976), Meyer de Schauensee (1984), Riles (1958), Roberts (1991), Round (1988), Sarker & Sarker (1985), Smythies (1986), Wells (1999).

## Accipitridae (i: snake-eagles, serpent-eagles)

### 67 SHORT-TOED SNAKE-EAGLE *Circaetus gallicus* (Gmelin, 1788)

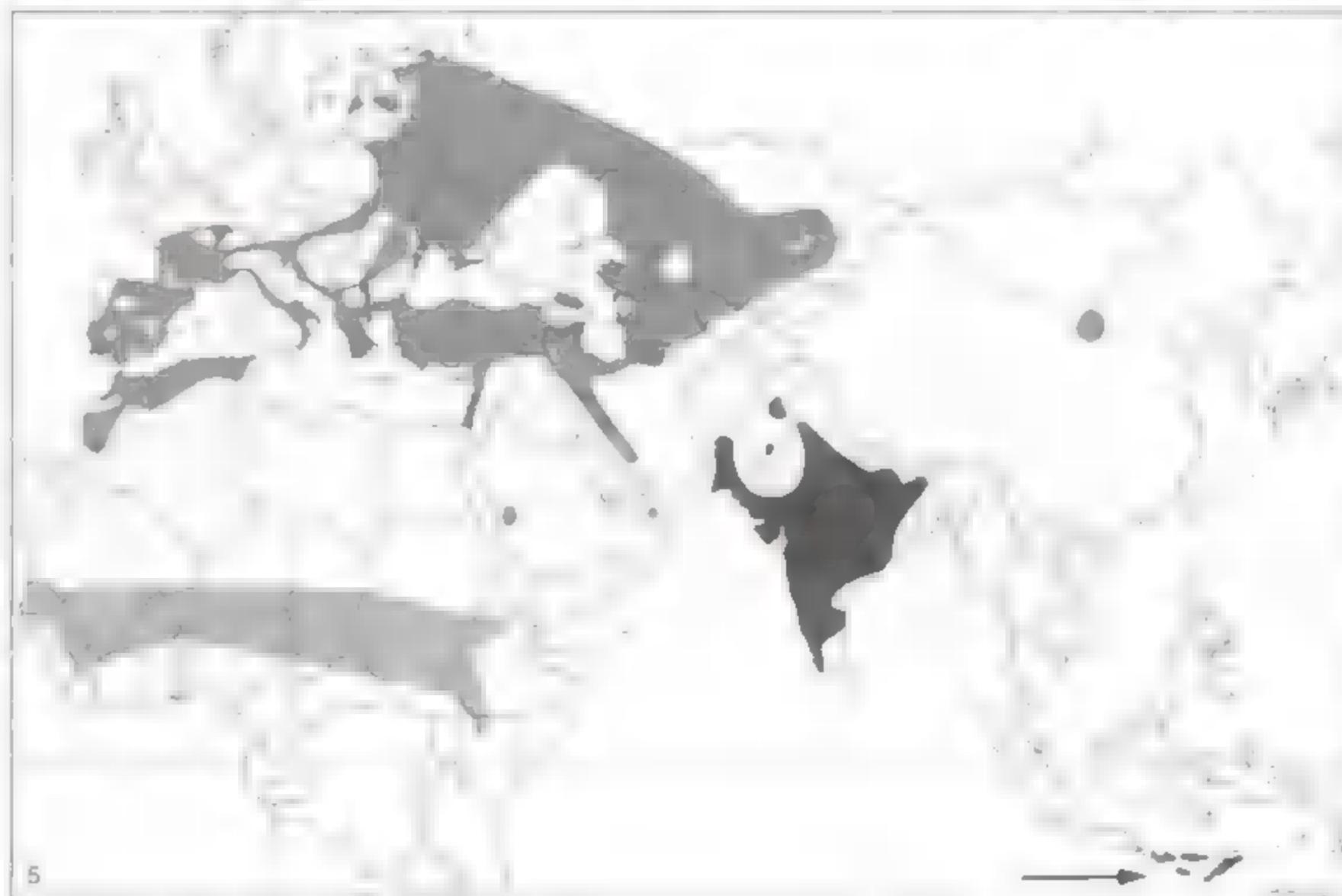
Plate 24

Other names: Short-toed Eagle, European Snake-eagle

**DISTRIBUTION** Palearctic (60°N to 28°N) and Indomalayan (34°N to 8°N, plus isolated population at 8–10°S in Wallacea), also Afrotropical in winter (c20°N to 6°N, mainly 16° to 10°N); order 5; greatly decreased and now scarce to rare in much of European range, but still locally or regionally common in other parts and elsewhere. Breeds northwest Africa, Iberia and central and south France through southern Europe, extending farther north in east Europe through eastern Poland, Ukraine and Belarus to Baltic States and southern Russia, thence east through Kazakhstan, Transcaucasia,

Asia Minor and parts of Middle East (south to Syria and Israel) to Lake Balkhash, Uzbekistan, Turkmenia and southern Iran; also Pakistan, Nepal and almost all India (but not Assam, nor Sri Lanka). Isolated population in Wallacea, long assumed to be migrants from continental Asia, apparently resident in several islands of Lesser Sundas from Lombok and Sumbawa to Timor. Has bred Lebanon, Libya and possibly Egypt, Saudi Arabia and Oman, as well as Mongolia.

**MOVEMENTS** Palearctic populations (those of Europe south into northwest Africa and Middle East, and east into central Asia) almost entirely migratory; Indian and



Lesser Sunda largely sedentary. European and probably most other Palearctic migrants winter almost exclusively in sahel and savannah band across sub-Saharan Africa north of equator, from southern Mauritania, Senegambia and northern Sierra Leone through southern Mali, Upper Volta and northern Ghana, Togo, Benin and Nigeria to southern Chad and Sudan, and Ethiopia. September–March, rarely straggling to Uganda and Kenya; individuals remain exceptionally in Spain, north Africa or Middle East, more frequently in Arabia. Northward migrations March–mid April (end February–early May) and southward mid September–mid October (August–November). Italian population (380–415 pairs) presumably crosses by Sicilian Channel to and from Tunisia's Cap Bon, whence total of c200 travelled northward on spring migration during 2–18 May 1975 (any that cross via Malta are at grave risk; see Population). Other western and central European populations migrate mainly via Gibraltar and Bosphorus respectively. Highest day and autumn totals noted at Gibraltar 1,328 and 9,040, and at Bosphorus 850 and 2,342 (these figures all from early 1970s). Generally larger numbers, presumably of east European to central Asiatic origin, recorded in 1980s at Klar Kesem, Israel (highest autumn total 8,000 in 1986), and at Gulf of Suez, Egypt (12,000 in 1984). Some eastern migrants may also join the resident populations of Pakistan and India, while some wander uncommonly still farther east to Burma, peninsular Thailand and Malaysia, and south Vietnam. Vagrants also regular in east Java and occasional in Bali; these probably stragglers from Lesser Sunda, but possibly migrants from continental Asia. In Europe, vagrants recorded north to Belgium, Netherlands, Denmark, Sweden and, most recently and more surprisingly, crossing the English Channel to Britain (Scilly, 1999).

**HABITAT** Most typically, dry broken country with scattered trees or clumps or sometimes open woodland, ranging from arid grassland, stony hillsides with thin scrub, and semi-desert to poor cultivation, lightly wooded savannah and wooded dunes, but in north of range also forested river valleys and wetlands with adjacent heaths or pastures. In sub-Saharan Africa, winters from desert edge and dry thornbush to very variably wooded savannah and even forest edge. Mostly sea-level to 1,200 m, sometimes to 1,600 m or even 2,000 m, very locally (e.g. Morocco, India) to c2,300 m.

**FIELD CHARACTERS** Large, pale-looking snake-eagle, brown to grey-brown above with very variably dark brown to white throat/chest and equally variably barred to almost plain white belly, but otherwise prominent yellow eyes in owl-like (or harrier-like) face on big rounded head, thick neck, and bare legs typical of genus. Mostly perches conspicuously on tree top, dead branch, telegraph pole, fence post or electricity pylon, but also on rock or hummock and, in heat of day, sometimes more inside tree canopy; longish wings fall short of, or sometimes just reach, tip of square-ended tail. Sexes very similar, and female averages only 1% larger, though c8% longer-tailed and 20% heavier; juvenile also rather similar, unlike those of related Beaufouin's and Black-chested Snake-eagles [68, 69], though often possible to distinguish at close range. **Adult** Pale grey-brown to brownish-grey above, streaked slightly darker, but for

darker brown flight-feathers and greater coverts; throat and chest may be similar in tone, giving hooded effect (even if rather streaked or mottled, especially on males), but some individuals simply look streaky on these areas or have them much paler, almost plain white; lower breast and belly white, with sparse dark bars, blotches or flecks produced by grey-brown feather-tips variable in extent and sometimes almost absent; three (infrequently four) visible tail-bands. **Juvenile** Generally rather similar when perched, bearing in mind variability of adults, but at close ranges can usually be distinguished, particularly in fresh plumage, by rufous tone to hood and underbody markings and by contrastingly paler median wing-coverts and tips to greater; throat also usually paler than chest-band. In worn plumage sometimes separable only by uniformity of plumage without any mix of feathers of different ages. **Second-year** After moult beginning at around one year old (about July in Palearctic), still more like juvenile, but distinguishable by mix of new and old feathers; outermost primaries retained throughout second year and show up as abraded and paler than rest. **Bare parts** Adult eyes orange-yellow, juvenile yellow. Cere pale grey. Feet blue-grey. **FLIGHT** Largish-looking pale raptor (appearing larger than it is) with broad and well protruding head, long broad wings, relatively small body, mid-length tail appearing narrow and sharply cornered when closed; wings narrowed at base, curved along secondaries and widest behind carpal joints, with prominent fingers when soaring; wingspan 2.7 times total length. Slow laboured beats; glides with wrist forward, wings slightly arched and hands drooping; soars on almost flat wings pressed forward; often hovers with leisurely flaps and dangling legs. **Adult** Above, greyish or brownish-grey head, mantle and smaller wing-coverts usually clearly paler than darker and browner greater coverts and flight-feathers; slightly lighter patch at base of primaries; rump and tail-base often paler than lower back and tail, which has black or blackish subterminal and two (occasionally three) other, thinner visible bands which vary in conspicuousness against shades of brown of rest of tail. Predominantly whitish below, typically with dark hood (head to chest), sparsely but coarsely barred abdomen, more spotted wing-linings and finely barred flight-feathers with broader subterminal band, clearer area at base of primaries, dark-edged greyish tips to outer primaries (so not solid black as in many raptors), and distinctly banded tail; but area of hood may be almost completely dark grey, or heavily or lightly streaked, or almost plain whitish, with corresponding variations in strength of barring on rest of underside (though pattern of wing-tips and subterminal band along trailing edges constant, and tail-banding always visible). **Juvenile** Broadly similar to adult, though less variable, main differences in fresh plumage being: median coverts and tips to greater (sometimes also tips to tail-coverts) obviously paler than rest of upperwings; clear, even white tips to flight-feathers and tail; rufous tone to hood (around paler throat) and to spotted (rather than barred) underbody; and generally less strongly barred underwings, which also lack broad subterminal trailing edges of adult; but abrasion results in loss of pale tips and dulling of rufous tones, so that some distinctions become much less clear. Wings narrower than those of both adult and immature,

with even trailing edges (no mix of feathers of different ages), and more S-curved in shape. **Second-year** Resembles juvenile, and generally paler below than most adults, but distinguishable by mix of new and old flight-feathers: outermost 2–4 worn primaries retained throughout second year, as are some secondaries, which stand out as shorter, narrower and paler than the new feathers.

**CONFUSION SPECIES** Greatest risk is in Afrotropical winter quarters, during September–March, with one particular plumage of each of two allospecies. Beaudouin's Snake-eagle [68] has much range overlap at that season (Senegambia and south Mauritania through Burkina Faso, north Nigeria, Cameroon and Central African Republic to southern Sudan and north Uganda) and, while juvenile (all dark brown with, at most, slight rusty tinge to edges of upperwing-coverts and underbody) and possible second-year stage (see Beaudouin's) distinct enough from Short-toed, adult often confused: distinguished by combination of darker brown hood with less streaked breast, uniformly darker upperparts without contrastingly paler median and lesser wing-coverts, sparsely but evenly fine-banded abdomen, almost or completely plain white wing-linings, and broader darker trailing edges below; also proportionately shorter wings and squarer-ended tail, quite often four visible tail-bars. The other allospecies, Black-chested Snake-eagle [69] of eastern and southern Africa, barely overlaps in range – though reaching north to east Sudan, Uganda and Kenya – and is quite distinct as adult (blackish hood/back, white abdomen/linings) and juvenile (rufous underbody/linings, darker secondaries, nearly plain grey tail), but second-year can resemble paler Short-toed, especially in pattern of underparts: has grey-brown upperparts/hood and more or less white linings, but contrasting dark juvenile secondaries retained, variable rufous markings on linings/axillaries/flanks, abdomen more blotched, often whitish face/throat. In western and central Palearctic, identification straightforward enough on shape, wing action and plumage, particularly flight pattern below. Only (and rather unlikely) confusion species for paler individuals are Osprey [8] (long-handed narrow wings and short tail, black carpal patches and two-tone underwings with central blackish band, uniformly dark upperwings, small head differently patterned even when banded); and pale morphs of Common Buzzard [203] (smaller, shorter-winged, dark carpal patches or at least carpal arcs, finely barred tail, dark tail-tip and dark trailing wing-edges when adult; soars on raised wings) and Western Honey-buzzard [18] (also smaller, thin head/neck, dark carpal patches, dark trailing edges or – as juvenile – darkish secondaries, different flight action). Dark-hooded and well-banded Short-toed can look superficially like banded-morph Western Honey-buzzard, but same differences apply. See also pale-morph Booted Eagle [230] and juvenile Bonelli's Eagle [227]. In central Asia and Indian region, Eastern Honey-buzzard [19] presents slightly greater risk of confusion in flight at distance because it is bulkier and more 'eagle-like' than Western Honey-buzzard, with well protruding but not particularly small head, long broad wings well rounded at six-fingered tips, and broad medium-length round-tipped tail shorter than breadth of wing-bases; also lacks strong carpal patches (but differences in patterns of tail and trailing-edges, and

flight action, still apply). In Indian region and Lesser Sundas, too, consider juveniles of Crested Serpent-eagle [74] (another snake-specialist, and juvenile pale below with three-banded tail, but really quite different, with much shorter wings also looking broader and raised in V when soaring) and of appropriate *Spizaetus* hawk eagles [237, etc] (wings also short, legs feathered, tail differently barred).

**VOICE** Noisy in breeding season, both perched and in flight; otherwise generally silent. Certain calls of male in particular often likened to Golden Oriole *Oriolus oriolus*, because of clear whistled quality (whereas female less ringing, less musical), but pattern quite different, sometimes more like *kyo-kyo-kyo...* of Herring Gull *Larus argentatus*. Another common call, plaintive *mer-ah*, resembles higher-pitched version of courting Tawny Owl *Strix aluco*.

**FOOD** Predominantly snakes (75–100% of prey in west and south Europe), some lizards; occasionally small mammals and amphibians, rarely birds and invertebrates. Snakes may be up to 1 m in length, and one in India estimated at 1.5–1.8 m; high proportion of non-poisonous snakes taken, but vipers and other venomous species also involved; usual daily intake put at one to two medium-sized snakes. Lizards include slow-worms, chameleons, geckoes, sometimes small monitors *Varanus*. Mammals range from voles and shrews to rabbits and hares. Birds probably mainly sick or injured; nestlings also sometimes taken. Forages mainly by quartering or circling at 10–30 m, intermittently lowering or kiting, but will sometimes stoop while soaring at much greater heights of up to 150 m, rarely even 450 m. Also still-hunts from prominent perch and occasionally stalks prey on ground or, for frogs and toads, in shallow water. Kills and often eats large snake on ground, or takes it to perch or nest, but swallows smaller prey in flight, often after crushing or tearing off head. Chick able gradually to gulp down whole 60–90 mm snake when only c3 weeks old.

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in pairs, though sometimes migrating in loose groups of up to 10–12. In India 'much given to circling aloft in pairs and noisily calling; and to remarkable tumbling and darting acrobatics', but in Europe aerial displays generally recorded as simple, brief and not particularly obvious (though male calls a lot from eyrie or perch). Mutual high-circling usually confined to early part of season and not complicated by play or dives. But undulating sky-dance by either sex quite impressive, particularly when performed by male carrying snake or twig in bill: high in air, this involves series of stepped drops of 15–20 m before soaring back to original altitude; he may also let go of snake and catch it again, or pass it to female afterwards. Both sexes (sometimes together) will chase intruders for considerable distances, initially adopting flight-threat posture with neck stretched forward, wings fully spread, folded tail raised, and legs dangling.

**BREEDING** Solitary. Late April–mid October in Palearctic, December–early May in Indian region. For size of bird, slight and relatively small structure of sticks and twigs, 50–75 cm across (up to 1 m when re-used) and 20–25 cm deep, lined with leaves and other greenery; typically at 3–6 m (rarely to 25 m) in crown or on

topmost lateral branch of usually low tree, sometimes in old nest of another bird, rarely on rock ledge. Clutch 1. Incubation 45–47 days. Fledging 70–80 days, though chick may move from nest to surrounding branches 10–15 days earlier; after this comparatively long fledging period, evidently soon independent and then leaves parents' territory.

**POPULATION** Marked decline in northern part of European range in 19th and early 20th centuries, probably as result of habitat loss and shooting, but perhaps now holding its own. Estimates in 1980s/1990s put total European breeding population within range of 5,350–7,500 pairs, and of whole West Palearctic within 8,000–14,000 pairs. There are no data for remaining populations, but relevant parts of west and central Asia might, on basis of area, be supposed to hold equivalent of European-Russian and Turkish numbers combined, somewhere in region of 2,000–6,000 pairs, and the Indian subcontinent, where the species is widespread but generally rather thin on the ground, at least an equivalent number. Thus, the world figure may be guessed at 12,000–26,000 pairs. Breeding success in Italy is put at 0.75 chicks fledged per pair, compared with 0.3–0.7 in France and 0.9 in northeast Greece. If one therefore assumes, say, 0.5–0.75 surviving juveniles per pair, the total number of Palearctic migrants moving south in autumn could be somewhere in region of 25,000–55,000 birds, which may be compared with the highest autumn totals recorded at Gibraltar (9,000), Bosphorus (2,342), Kfar Kesem (8,000) and Gulf of Suez (12,000), bearing in mind that some travel by the Sicilian route or cross the Mediterranean from other south European headlands (see *Movements*), while the numbers passing any particular point in the Middle East vary considerably from year to year with differing weather conditions and wind directions. Developing this approach by concentrating on the southwest European breeding population alone (2,570–3,500 pairs, including 1,700–2,100 in Spain, 100–300 in Portugal and 770–1,100 in southern France), one would expect a total of 6,425–8,750 birds to pass through Gibraltar in autumn, and this accords well enough with the numbers recorded there in 1970s and 1980s (see *Movements*). Although its populations are now probably fairly stable, this species, along with other raptors that migrate across the Mediterranean, is liable to suffer from shooting; any Short-toed that cross via

Malta are at grave risk, for 10–20 are shot annually there, and in 1993 all 50 or so that arrived on one day fell victim to this activity.

**GEOGRAPHICAL VARIATION** Individually variable in strength of patterning of underparts in particular, but in no sense polymorphic. Monotypic, unless isolated population of Lesser Sundas, which averages smaller and may differ somewhat in timing of moult, proves distinguishable. Easternmost birds of Asia formerly separated as *heptneri*, but differences clinal. Since isolated observations in 1950s of supposed mixed pairings involving the essentially African Beaudouin's [68] and Black-chested [69] and the Eurasian Short-toed, whose migratory western populations winter in sub-Saharan savannah, it became fashionable to treat these three taxa as conspecific; Beaudouin's is also somewhat intermediate between the other two. But there was never clear evidence of successful interbreeding, and plumage differences are significant enough for all three to be regarded as allospecies within a superspecies. In particular, both Beaudouin's and Black-chested have very different adult and juvenile stages, whereas Short-toed shows few constant age distinctions and no reliable regional field characters over its large and interrupted breeding range.

**MEASUREMENTS** ♂ wing 506–585 mm, ♀ 512–605 mm; ♂ tail 246–306 mm, ♀ 255–330 mm; ♂♀ tarsus 86–105 mm. **Weights** ♂ 1.2–2.0 kg, ♀ 1.5–2.5 kg.

**REFERENCES** Ali & Ripley (1968), Amores & Franco (1981), Beaman & Madge (1998), Bergier (1987), Boudouini *et al.* (1953), Brown (1974a, 1976b), Brown *et al.* (1982), Bureau (1955), Clark (2000), Clark & Schmitt (1999), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Eichécopar & Hür (1978), Finch-Davies & Kemp (1980), Flint *et al.* (1984), Forsman (1999), Génsbøl (1986, 1995), Goodman *et al.* (1989), Glutz von Blotzheim *et al.* (1971), Grimmett *et al.* (1998), Hagemeyer & Blair (1997), Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1983), Kemp & Kemp (1998), Knvstautas (1993), Król (1983), Lekagul & Round (1991), MacKinnon & Phillipps (1993), Madon (1955), Meyburg *et al.* (1996), Mountfort (1958), Petreti (1988), Portelli (1994), Porter *et al.* (1981, 1996), Richardson (1990), Roberts (1991), Rocamora (1994b), Serle & Morel (1977), Shirihai (1996), Shirihai & Christie (1992), Svensson *et al.* (1999), Thiollay (1968a, 1977b), van Balen & Compost (1989), Vaurie (1965), Zimmerman *et al.* (1996).

## 68 BEAUDOUIN'S SNAKE-EAGLE

*Circaetus beaudouini* Verreaux & Des Murs, 1862

Plate 24

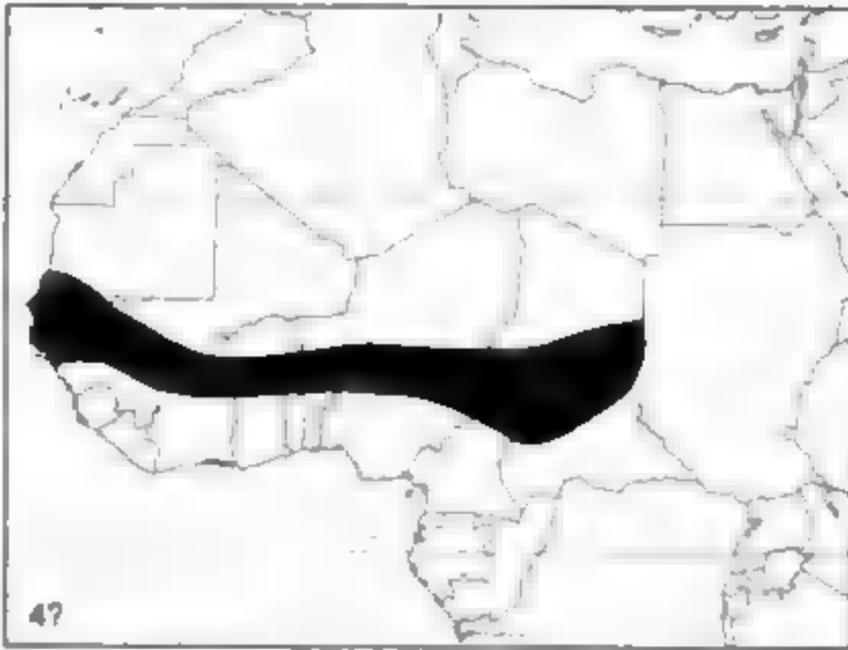
Other name: Beaudouin's Harrier-eagle

**DISTRIBUTION** Afrotropical (16°N to 2°N); order 4?; generally considered local and uncommon to rare, though perhaps under-recorded. Tropical Africa: in relatively narrow band from Senegambia and south Mauritania across to southern Sudan, south to Burkina Faso, north Nigeria and Cameroon, Central African Republic, and north Uganda; not certain in Kenya.

**MOVEMENTS** May be sedentary in some areas, but

elsewhere nomadic or making limited seasonal movements. In at least parts of West Africa moves south in dry season, north in rains; in Gambia considered dry-season visitor. Odd records south to Liberia and, possibly, east to Kenya may involve wanderers.

**HABITAT** Woodland, wooded savannah, and open country with trees, often near water, also fertile plains; not usually in very arid areas, but thornbush after rains. Sea-level to c1,500 m, locally to 2,000 m, but mainly below 1,000 m.



**FIELD CHARACTERS** Big snake-eagle, as adult grey-brown but for barred white belly, with typical large rounded head, thick neck, prominent glaring yellow eyes, bare grey legs and cere. Often perches openly, but sometimes within canopy; longish wings fall short of square-ended tail. Sexes similar, and female averages only 3% larger; juvenile and immature both distinct, but probably much as adult by some time in third year. **PERCHED Adult** Dark brown upperparts and head to chest; sometimes variable whitish streaks on throat; lower breast and belly white with sparse and narrow but even dark brown barring; three to four rather indistinct tail-bands. **Juvenile** All dark brown above and below, somewhat streaked whitish on head and slightly barred on flanks and crissum. **Immature** Probably towards end of first year, head, neck and underparts become blotched and then largely whitish; this plumage perhaps retained into early third year. **Bare parts** At all ages, eyes yellow, cere pale grey, feet grey-white.

**FLIGHT** Large raptor with well projecting head, longish wings, longish narrow tail; wings narrowed at base, curved along secondaries and widest behind carpal joint, with prominent fingers when soaring; wingspan 2.6 times total length. Slow deep beats; glides with wrists forward and wings very slightly arched; soars on almost flat wings pressed forward. **Adult** Dark above, with blacker wings and tail; below, dark head and chest, and thinly barred abdomen and axillaries, contrast with almost plain whitish wing-linings; dark up to primaries and three to four bands on secondaries and tail. **Juvenile** Largely rufous on head, body and forepart of wing-linings (not greater coverts); no dark hood; thinly barred flight-feathers and tail. **Immature** Paler and whiter; more mottled above, with contrasting pale brown rump; and largely whitish below, variably tinged rufous.

**CONFUSION SPECIES** During September–March, adult easily mistaken for migrants of slightly bigger and proportionately longer-winged Short-toed Snake-eagle [67], which seldom has more than three visible bands on its slightly less square-cut (and sometimes more rounded or slightly wedge-tipped) tail; more important, Short-toed's admittedly varied range of plumages does not include Beaudouin's combination of dark hood, sparsely and evenly fine-banded abdomen and almost plain white wing-linings. (Adult Black-chested has blacker hood and upperparts, plain white abdomen, clear quill-bands, while far larger Martial Eagle [248]

has different proportions, spotted abdomen, dark wing-linings, closely barred quills.) Juvenile Beaudouin's more like juvenile Black-chested (which, however, is clearly dark rufous below, sometimes mottled whitish) or might even be confused with morph juveniles of Western Honey-buzzard [18] or African Gymnogene [89]. But honey-buzzards, gymnogenes and appropriate colour morphs of various *buteos* – Steppe (Common) Buzzard [203], Red-necked Buzzard [210], Augur Buzzard [212] – are all distinguished by characteristic shapes and wing positions, and whitish or less banded quills.

**VOICE** Lone birds usually silent. Range of calls during breeding season probably comparable to those of Short-toed [67] and Black-chested [69], but no data.

**FOOD** Mainly snakes; probably, like congeners, also some lizards and small mammals, occasional birds and insects. Still-hunts from prominent perch, such as dead tree or telegraph pole; will also forage by quartering and periodical hovering.

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in pairs. Little information on display-flights, but doubtless at least mutual soaring and sky-dance like congeners.

**BREEDING** November–March in West Africa, but season likely more extended farther east nearer equator. Small stick nest at up to 25+ m in top of tree, including African mahogany, acacia and euphorbia. Clutch 1. Incubation and fledging periods not recorded, probably c45 and c70 days.

**POPULATION** No data on densities. Although known distribution extends nearly 6,000 km from west to east, narrow latitudinal range and general scarcity suggest total numbers unlikely to exceed four figures.

**GEOGRAPHICAL VARIATION** Monotypic. Along with Black-chested [69], often treated as race of Short-toed Snake-eagle [67] (migratory western populations of which winter in Africa) because of isolated observations of supposed mixed pairings (Brown 1974, Brown *et al.* 1982) and because Beaudouin's somewhat intermediate between the other two. But the plumage differences are significant enough for all three to be regarded as separate species within a superspecies. In particular, whereas adult and juvenile short-toed are rather similar, adult and juvenile Beaudouin's are very different, with the juvenile comparable to juvenile Black-chested; and, while adult Beaudouin's more resembles Short-toed, the latter shows few constant age distinctions and no recognisable regional characters over its large and interrupted Eurasian breeding range. (See also Dowsett & Dowsett-Lemaire, and Clark.)

**MEASUREMENTS** ♂ wing 475–486 mm, ♀ 490–502 mm; ♂♀ tail 247 (worn)–278 mm, tarsus 92–96 mm. **Weights** No data.

**REFERENCES** Bannerman (1930, 1951, 1958), Britton (1980), Brown (1974a), Brown *et al.* (1982), Browne (1981), Clark (2000), Dowsett & Dowsett-Lemaire (1980), Finch-Davies & Kemp (1980), Gore (1990), Grimes (1987), Jensen & Kirkely (1980), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Morel & Morel (1990), Newman (1983), Serle (1943), Serle *et al.* (1977), Snow (1978), Thiollay (1975c, 1978c, 1985d), Voous (1966), Zimmerman *et al.* (1996).

69 **BLACK-CHESTED SNAKE-EAGLE**  
*Circaetus pectoralis* A Smith, 1829

Plate 24

Other names: Black-breasted Snake-eagle, Black-chested or Black-breasted Harrier-eagle

**DISTRIBUTION** Afrotropical (19°N to 33°S); order 5+; widespread, but varying from scarce or uncommon to locally common. Eastern and southern Africa: eastern Sudan, Ethiopia and western Somalia south through Uganda and Kenya, and then almost throughout from southern DR Congo and Tanzania southwards.



**MOVEMENTS** Mainly sedentary or nomadic, but some evidence of northward departures from northeastern South Africa and (not necessarily related) arrivals in Zimbabwe, April–May–September/October, and vice versa. Considered generally sedentary near equator, but some wandering there too, with October and February peaks; according to Snow (1978), species migrates north from Kenya to south Sudan in wet season, but little evidence of this.

**HABITAT** Light woodland, savannah, open plains, dry thornbush and other fairly open to open country, even desert. Sea-level to 3,400 m.

**FIELD CHARACTERS** Big snake-eagle, as adult blackish-brown with plain white belly, with typically large cowed head, big glaring yellow eyes, thick neck, bare legs, small feet. Perches prominently on dead trees, poles, pylons; also walks easily on ground; longish wings about equal to tail-tip. Sexes similar, but female averages 4% larger; juvenile distinguishable; apparently as adult in third year.

**PERCHED Adult** Mainly blackish-brown above and down to chest, with contrasting plain white lower breast to undertail-coverts. **Juvenile** Head and underparts all rich rufous; darker brown above with rufous edgings. **Immature** Based on captive bird, immature feathers start to appear in second half of first year: some blackish on chest at 6 months; varying amounts of grey-brown on head, back and wing-coverts by eight months; and some brown-centred white on abdomen from ten months. This process continues in blotchy stages through second year, by end of which more like adult; but blackish parts still mottled with grey-brown (chest variably also with white) and abdomen still brown-spotted. Apparently becomes as adult during third year, with odd brown spots

last indications of immaturity. **Bare parts** Eyes yellow to orange-yellow. Cere pale grey. Feet greyish-white.

**FLIGHT** Large raptor with well projecting head, long wings, longish narrow tail; wings narrowed at base, curved along secondaries and widest behind carpal joint, with prominent fingers when soaring; wingspan 2.6 times total length. Slow deep beats; glides with wrists forward and wings very slightly arched; soars on almost flat wings pressed forward; regularly hovers or hangs on wind. **Adult** Looks all dark above; below, largely white but for contrasting black head and chest, three clear black bands on secondaries and tail, and black-tipped primaries. **Juvenile** Rich rufous body and wing-linings (but white greater coverts), and thinly barred greyish secondaries and tail that look almost plain grey at distance; primaries again white-based and black-tipped. As bird moults into adult plumage, every intermediate between these two stages (see Perched).

**CONFUSION SPECIES** Adult often confused at long range, when perched, with adult Martial Eagle [248] (but that is much larger and bulkier, different shape, slightly crested, legs feathered, white abdomen spotted); in flight, broader-winged Martial immediately distinguished by mainly dark underwings and tail. In Uganda and Kenya, slight possibility of confusion with various ages of closely related Beaudouin's Snake-eagle [68] (when adult, browner head and upperparts, thinly barred abdomen and less contrastingly banded quills; as juvenile, all dark brown). Even lower likelihood of confusion with the two smaller snake-eagles [71, 72] in eastern Africa. Note comments about dark and rufous juvenile morphs of Western Honey-buzzard [18] and African Gymnogene [89], and certain ages or colour morphs of various butors [203, 210, 212] in discussion under Beaudouin's.

**VOICE** Generally silent except when breeding. Then harsh high repeated *kaa-rrr*, or *shree-eeee*, in display-swing; and *koo-koo-koo...kueeu-kueeu-kueeu* (reminiscent of African Fish-eagle [44]) used by pair near nest and in aggression towards intruders. Other fluting and melodious calls at nest.

**FOOD** Snakes, also other reptiles, small rodents, amphibians, some insects (beetles, alate termites); occasionally small birds, bats, once fish. Snakes mainly smaller ones, whether venomous or not, but recorded up to 1.8 m in length. Other reptiles include small lizards, chameleons, even metre-long water monitor. Mainly forages in flight, periodically hovering with gently fanning wings and spread tail at heights of 15–100 m and then dropping down, often in stages, with feet extended. (Even recorded hovering long after dark in floodlights at Harare airport.) Also still-hunts from tree or other perch, including one record involving small fish caught just beneath surface, only bird's legs being immersed; occasionally forages on ground, particularly at sites of recent grass fires. Small snakes carried into air and swallowed whole after being crushed with feet; larger prey killed and torn up on ground or carried to nest or perch.

**SOCIOSEXUAL BEHAVIOUR** More gregarious than other snake-eagles, particularly during migrations or nomadic movements when 5–15+ not infrequently roost semi-socially (43 in 20 ha in Zambia, concentration of nearly 200 in small area in Zimbabwe) and five or more then sometimes hunt within sight of one another. Display-flights apparently involve no more than mutual soaring and occasional sky-dancing.

**BREEDING** Season protracted throughout range: November–June in Ethiopia, December–October in East Africa south to Zambia, mainly June–February in Zimbabwe and June–January in South Africa. Small nest of thin sticks, 60–70 cm across and 20–25 cm deep, lined with green leaves; usually at 3.5–7.5 m, rarely up to 24 m, often on top of acacia or in crown of euphorbia, rarely on pylon. Clutch 1. Incubation 51+ days. Fledging c90 days.

**POPULATION** Unaccountably scarce in some areas, common in others. No real estimates of populations but,

considering wide range in eastern and southern Africa, total numbers may exceed five figures.

**GEOGRAPHICAL VARIATION** Monotypic. See comments under Beaudouin's Snake-eagle [68] regarding earlier treatment of both it and this species as races of Short-toed Snake-eagle [67].

**MEASUREMENTS** ♂ wing 490–534 mm, ♀ 513–570 mm; ♂♀ tail 255–315 mm, tarsus 85–100 mm. **Weights** ♂♀ 1.2–2.3 kg, averaging 1.5 kg; one ♂ 2.2 kg.

**REFERENCES** Allan (1988b), Barbour (1974), Benson & Benson (1975), Biggs *et al.* (1979), Britton (1980), Brown (1952, 1974a), Brown *et al.* (1982), Child (1964), Clark (2000), Colebrook-Robjent & Aspinwall (1986), Dowsett & Dowsett-Lemaire (1980), Ginn *et al.* (1989), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Lorber (1971), Maclean (1993), Naylor (1974), Osborne (1975), Pickford *et al.* (1989), Pinto (1983), Stevenson (1953), Steyn (1966, 1982), Tarboton & Allan (1984), Woods (1975), Zimmerman *et al.* (1996).

## 70 BROWN SNAKE-EAGLE *Circaetus cinereus* Vieillot, 1818

Plate 24

Other name: Brown Harrier-eagle

**DISTRIBUTION** Afrotropical (18°N to 29°S); order 5; widespread, even if generally rather scarce to uncommon. Sub-Saharan Africa: Senegambia with adjacent Mauritania and Guinea, Burkina Faso with adjacent Mali and Ghana, and from northern Nigeria through southern Chad and central Sudan to Ethiopia and Somali Republic, thence south from eastern and southern DR Congo, Uganda and Kenya to northeast Namibia, north Botswana and eastern South Africa.



**MOVEMENTS** Generally considered sedentary, but in some regions nomadic, often apparently not breeding annually in same areas, though individual pairs have large home ranges of up to 200 km<sup>2</sup>; apparently mainly dry-season visitor in southern Senegambia, moving northwards during rains. One ringed in northeastern South Africa recovered seven years later 2,100 km away in DR Congo.

**HABITAT** Open woodland, wooded savannah, dry thornbush, often where gulleys or wooded hillocks break

up flatter areas; but not in forest, treeless country or desert. Usually in or near more wooded areas than only other large or really widespread African snake-eagle, Black-chested [69]. Sea-level to 2,000 m.

**FIELD CHARACTERS** Biggest snake-eagle, all dark brown as adult, with large cowled head, glaring yellow eyes, thick neck, bare legs, small feet (but bill and feet more powerful than congeners). Perches prominently for long periods, very upright, on hillocks, tree tops, pylons; also walks easily on ground; longish wings about equal to tail-tip. Sexes similar, and female averages only 2% larger; juvenile rather to very similar.

**PERCHED Adult** All dark brown, with almost purplish sheen in some lights, but for three thin whitish tail-bars and white tail-tip; best identified by shape, yellow eyes, and greyish cere and feet (see Confusion Species).

**Juvenile** Often very similar, if less sheened, with thin paler edges above in fresh plumage; some show white feather-bases on nape and belly. In South Africa greater tendency to white blotches on abdomen and, in some cases, streaking on head.

**Immature** Late in first year and during second, at least some immatures become variably flecked or patched with white below and have a few flank feathers finely barred white (amount of white on underparts increases on those juveniles, e.g. in South Africa, showing white-blotched abdomen); presumably adult by third year. **Bare parts** Eyes yellow to orange-yellow. Cere and feet pale grey to greyish-white.

**FLIGHT** Large raptor with well projecting head and, though shape resembles other snake-eagles, wings thinner, with less narrowed base and straighter trailing edges, so that they appear still longer and tail slightly less long. Slow deep beats; glides and soars on flat wings; wingspan 2.3 times total length. **Adult** Looks all dark, including wing-linings, but for contrasting unmarked silvery-white flight-feathers; also thin pale tail-bars, though these not always obvious. **Juvenile/immature** Often indistinguishable from adult, unless thin pale

scaling shows above, but some individuals have varying amounts of white flecks or blotches on abdomen.

**CONFUSION SPECIES** When perched, easily distinguished by large cowled head, yellow eyes, bare legs and upright stance from other brown African eagles, such as Tawny [220], Wahlberg's [229] and migrant Lesser and Greater Spotted [218, 219]. On head shape, more likely to be confused with juvenile Bateleur [73] (short tail and legs, brown eyes; see fig. 31) or, in poor light, juvenile Black-chested Snake-eagle [69] (head and underparts rufous-brown). In flight, plain silvery remiges diagnostic against dark body and wing-linings.

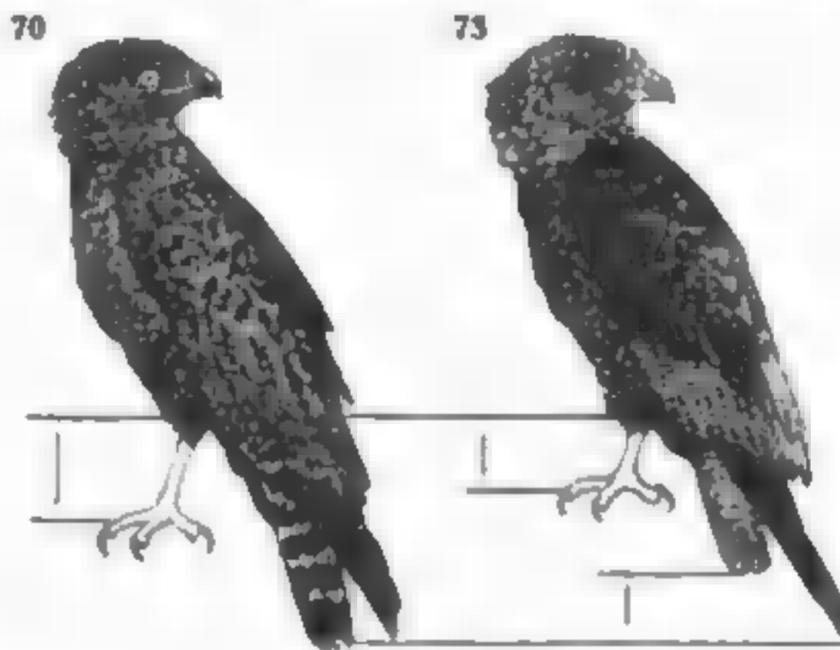


Fig. 31. Comparison of Brown Snake-eagle *Circaetus cinereus* [70] with juvenile Bateleur *Terathopius ecaudatus* [73] to show differences in lengths of tarsi and tails, relative positions of wing- and tail-tips, also eye colours, tail markings and head shapes.

**VOICE** Usually silent, but very vocal in breeding season, with versions of hoarse guttural *kok-kok-kok* as contact note and against intruders, as well as in soaring display flights (when series may conclude with crowing *kaaaw*). Soft *kurr-oo* uttered by pair at nest.

**FOOD** Largely snakes, also lizards, rarely gamebirds and rodents. Snakes both harmless and poisonous, often bigger than those caught by congeners (up to 2.8 m in length recorded). Lizards include monitors, as well as smaller species and chameleons. At least in East Africa, also takes some guineafowl, francolins *Francoelinus* and

occasional chickens. Although sometimes foraging in flight and hovering like other snake-eagles, mostly still-hunts from hillock or tree, often striking prey from long flight. Prey torn up or swallowed on ground, apparently rarely (never?) in flight like other larger snake-eagles.

**SOCIOSEXUAL BEHAVIOUR** Solitary; even pair-members roost separately and are not seen much together. Although vocal in display-flights, these usually involve only soaring and circling by male alone, but hovering butterfly-flight by two birds, one following the other, has been recorded; also interlocking of claws, and one bird diving down at nest site where mate perched.

**BREEDING** November–July in northern range, February–October in Kenya, and mainly December–July in Zimbabwe (though occupied nests may occur in any month in southern Africa). Small nest of thin sticks, 60–70 cm across and 15–30 cm deep, lined with green leaves; at 3.5–12 m on flat-topped acacia or euphorbia crown, rarely within canopy, sometimes on top of succulent plant or epiphyte, or nest of buffalo-weavers *Bubalornis*, rarely on pylon (e.g. on old nest of another raptor). Clutch 1. Incubation 48–50+ days. Fledging c 109 (97–113) days.

**POPULATION** No evidence of status changes, and few estimates of population, but solitary nature and, in Kenya at least, indications of requirement of up to 200 km<sup>2</sup> per pair make this a difficult species to census; on that basis, however, with total range of c 8 million km<sup>2</sup>, population unlikely to exceed five figures. No information on possible threats, though must be vulnerable to effects of woodland clearance.

**GEOGRAPHICAL VARIATION** Monotypic. Note greater tendency to white blotching on immatures in southern Africa.

**MEASUREMENTS** ♂ wing 485–550 mm, ♀ 490–567 mm; ♂♀ tail 245–295 mm, tarsus 92–108 mm. **Weights** 1.5–2.5 kg (average of 26 = 2.1 kg).

**REFERENCES** Allan (1988b), Benson & Benson (1975), Biggs *et al.* (1979), Britton (1980), Brown (1952, 1953, 1976b), Brown *et al.* (1982), Calebrook-Robjent & Aspinwall (1986), Ginn *et al.* (1989), Gore (1990), Grimes (1987), Kemp & Kemp (1998), Lewis & Pometoy (1989), Maclean (1993), Pickford *et al.* (1989), Pinto (1983), Steyn (1964, 1979b, 1975b, 1982), Tarboton & Allan (1984), Thuollay (1978c), Zimmerman *et al.* (1996).

## 71 EAST AFRICAN (BANDED) SNAKE-EAGLE *Circaetus fasciolatus* Kaup, 1847

Plate 25

Other names: Southern Banded, Fasciolated or Fasciated Snake-eagle

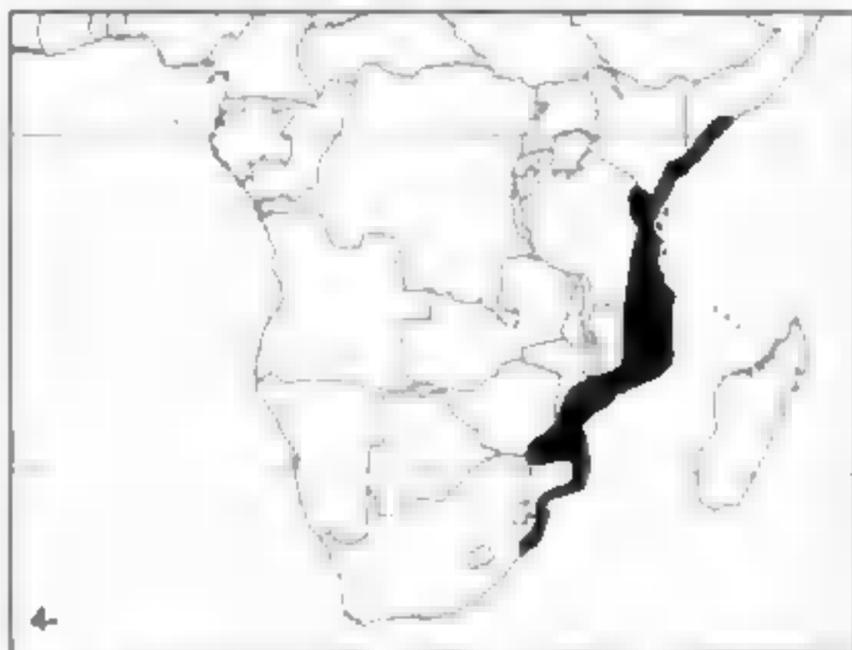
**DISTRIBUTION** Afrotropical (2°N to 31°S); order 4; locally common, often scarce to uncommon but probably under-recorded. Endemic to coastal and subcoastal eastern Africa: southern Somalia to southern Mozambique and adjacent mid-northeastern corner of South Africa (easternmost part of former Natal), mostly within 20–40 km of coast, but locally inland, mainly along watercourses, up to 150 km from coast in Kenya (Voi, also Garsen) and up to 500 km in Tanzania (Ruaha

National Park, also Kitangari, Usambara Mountains), and recorded up the Save river in Mozambique to easternmost Zimbabwe 250 km inland.

**MOVEMENTS** Usually considered sedentary, but seasonal absences or increases, especially July–October, indicate at least local movements in East Africa and perhaps some northward migration during the southern winter.

**HABITAT** Evergreen coastal and subcoastal forest, and dense woodland farther inland, often near rivers, lakes

and swamps. Seldom seen away from cover, but in early mornings may sometimes perch prominently on trees in adjacent cultivation or grassland, and during migratory movements appears in both open woodland and savannah. Sea-level to 1,500 m.



**FIELD CHARACTERS** Smallish stocky snake-eagle, as adult brown and grey with barred belly; still with typical large cowled head, yellow eyes, thick neck. Perches very upright, but normally not prominently; relatively short wings reach only half down relatively long tail. Shy and easily overlooked except for repeated calling. Sexes similar, and female averages only 2% larger; juvenile distinguishable.

**PERCHED Adult** Grey-brown on head and (often browner) chest, blacker with obscure rufous tips on back and wing-coverts, and barred grey-brown and white on abdomen; white-tipped grey-brown tail with two blackish bars and broader subterminal band. **Juvenile** Browner above with white-streaked head and white-tipped wing-coverts; white below, with thin black streaks on throat and more buffy breast, indistinct brownish barring on flanks and thighs; tail-bars thinner and more widely spaced (five bars until first moult?). **Immature** Later (in second year?), head whitens (some become almost whitish-headed), back paler, white tips wear off (or feathers replaced), streaks and barring reduced below. **Bare parts** Eyes cream to pale yellow. Cere yellow. Feet dull yellow.

**FLIGHT** Mid-sized raptor, still with well projecting head like other snake-eagles, but relatively shorter, broader-looking wings with rounded tips and proportionately longer tail (typical of forest raptors) give something of character of large accipiter; wingspan 2.2 times total length. Fast shallow beats and flat glides when flying short distances from one perch to another; soars above canopy largely or only in display. **Adult** From above or side shows head greyer than back and wings; below, main features are grey-brown head and often browner chest, barred abdomen and boldly three-banded tail, while more finely barred underwings look mainly whitish with broad black trailing edges. **Juvenile/immature** Browner than adult, with paler head: looks largely buff and whitish below, with indistinct wing-barring; tail much as adult, but thinner bars, wider spaces (or five bars until first moult?).

**CONFUSION SPECIES** Although sometimes likened to giant African Cuckoo-hawk [9] or large accipiter, mainly because of grevish chest, barred abdomen and

yellow eyes, snake-eagle shape and stance distinctive. Only likely confusion ever is with almost entirely allopatric Banded Snake-eagle [72], which is slightly larger (despite its alternative name 'Smaller', though it is shorter-tailed), less shy and noisy, more widely distributed, and less barred below; its white-tipped tail is also black with single central white band (though that pattern is less clear on juvenile, which has more extensively whitish tail with broad distal band, dusky base) and, when perched, wing-tips much nearer tail-tip. Chanting-goshawks [104–106] and Gabar Goshawk [107] have grey head to chest, and barred abdomen, but very different shape, character and flight, orange-red bill and legs, white rump, and many other differences, including habitat preferences.

**VOICE** Noisier than snake-eagles of open country. Main call high fast *ko-ko-ko-ko-kan*, uttered both when perched and in soaring flight; also louder and more ringing *kouaana* and crowing *kurk-urr kurk-urr* ('like a cockerel with a breaking voice': Steyn).

**FOOD** Largely small snakes and lizards; other items probably incidental, but some insects (large beetles, alate termites) and single records of mouse, weaver and 'chickens'; likely also to take amphibians. Apparently all food obtained by still-hunting from series of tree perches, mainly at forest edges or clearings or near water, and then dropping to ground.

**SOCIOSEXUAL BEHAVIOUR** Generally solitary. When soaring, utters the main call in presumed display.

**BREEDING** Very few data. Occupied nests mainly September–March, but laying also recorded July in Kenya. Only three nests described: small structure of thin twigs, c60 cm across and c30 cm deep, lined with green leaves, at c7.5–10 m in fork well below canopy or more conspicuously on creeper-festooned tree. Clutch 1. Incubation and fledging periods unknown.

**POPULATION** Until the 1980s, was considered 'reasonably common' to very locally 'common' in Kenya, Tanzania and north Mozambique, but 'rare and localised' south of the Zambezi river. Since then, much coastal forest has been degraded and fragmented 'as a result of the extraction of wood for use as timber, charcoal, poles and firewood' and this species is now considered 'uncommon over most of its range' (BirdLife International, from whose summary the following regional counts are taken). In Mozambique, 'probably no longer occurs on the coast between the Limpopo and Save rivers, due to human... pressure and deforestation, while the population south of the Save river is probably fewer than 30 birds' (note that these two statements are contradictory, since the Limpopo is south of the Save); and in northeastern South Africa, where it has now withdrawn from the southern part of its former, already small, range, probably only 40–50 pairs remain. But this species was already rare and local in these southern regions, and perhaps more significant are two surveys in the late 1990s, which found it in only 16 of 31, and 24 of 41, coastal forest blocks in Kenya and Tanzania respectively. Yet it still appears to be locally common farther inland, as in the Usambara Mountains. The total range is probably of the order of 100,000 km<sup>2</sup> and, though suitable coastal habitat is now clearly fragmented (and likely to

become more so), an average density of, say, only 1 pair/100 km<sup>2</sup> would suggest a possible total, including immatures, somewhere in the range 2,500–3,000 birds.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 363–380 mm, ♀ 371–390 mm; ♂♀ tail 245–270 mm, tarsus 76–87 mm. **Weights** ♂ 908–960 g (two), ♀ 1.1 kg (one).

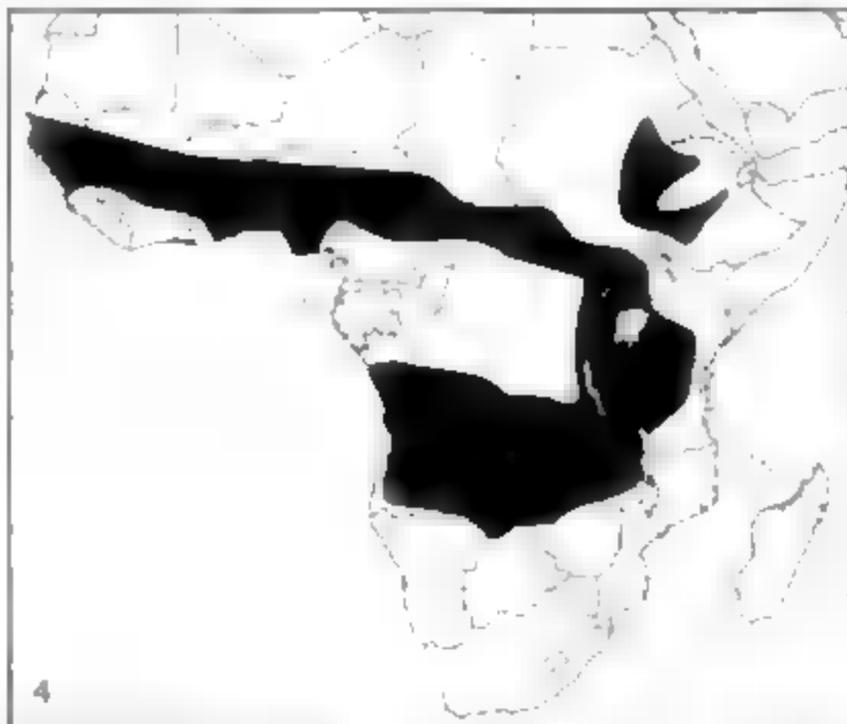
**REFERENCES** Benson & Benson (1975), BirdLife International (2000), Britton (1980), Brooke (1971), Brown (1969, 1976b), Brown *et al.* (1982), Burgess & Muir (1994), Clancey (1987b, 1990), Danciel (1965, 1966a), Ginn *et al.* (1989), Harrison *et al.* (1977), Kreuger (1970), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957–73), Pickford *et al.* (1989), Steyn (1982), Stuart & Hutton (1977), Zimmerman (1970), Zimmerman & Mumford (1965), Zimmerman *et al.* (1996).

## 72 (SMALLER) BANDED SNAKE-EAGLE *Circaetus cinerascens* JW von Muller, 1851

Plate 25

Other names: Smaller or Western Banded Snake-eagle, Banded Harrier-eagle

**DISTRIBUTION** Afrotropical (16°N to 19°S); order 4; widespread but, though probably under-recorded, mostly rather uncommon. Rather patchily in sub-Saharan Africa: Senegambia; general region of northern Ivory Coast and Ghana; Nigeria to southern Sudan, eastern DR Congo and Kenya; eastern Sudan and Ethiopia; and southern DR Congo and Angola through Zambia with western Malawi and Mozambique to northeastern Namibia and northernmost Botswana and Zimbabwe, these last especially along Okavango-Chobe-Zambezi river complex.



**MOVEMENTS** Largely sedentary, but immatures more nomadic; in Ivory Coast some southward movement evident during rains, June–September, and some may apply in Senegambia where apparently less scarce in dry season; possibly also influx into East Africa, August–February.

**HABITAT** Woodland along large river valleys, humid forest edges and strips, moister wooded swamph, locally riverine trees in dry thornbush. At times forages in adjacent cultivation and bush. Sea-level to 2,000 m.

**FIELD CHARACTERS** Smallish stocky snake-eagle, largely grey-brown as adult, with typical large cowed head, yellow eyes, thick neck, but proportionately shorter tail and wings than larger species. Perches very upright for long periods in riverside trees, or sometimes prominently on dead branches out in open; wing-tips reach well down rather short tail. Secretive rather than

shy and much less noisy than East African (Banded) Snake-eagle [71]. Sexes rather similar, female usually darker and more boldly barred and averaging only 3% larger, juvenile distinct.

**PERCHED Adult** Mainly grey-brown with slightly paler cheeks and throat, and very variable white barring on lower flanks, belly and thighs; main features are white-tipped blackish tail with broad white central band, and extensive orange-yellow on bill-base, as well as yellow eyes and legs. Females tend to be darker than males, with less, but more prominent, barring on belly and thighs, but some have no barring at all, though these are greyer than all-dark immatures (see below). **Juvenile** Brown above with white-streaked crown and buff-edged wing-coverts; creamy-buff below, darkest on breast, with vague spots and bars on belly and thighs; much of tail pale brown with dark brown subterminal band (narrower than adult's); only cere yellow. **Immature** Moulting in latter part of first year apparently produces whiter stage, much streaked and mottled, before becoming more uniformly dark brown (second year or third?) with tail, flight-feathers and bare parts much as adult; may breed in this plumage. **Bare parts** Adult eyes pale yellow, juvenile whitish. Adult cere (and bill-base) orange-yellow, juvenile yellow (bill-base brown). Adult feet yellow, juvenile whitish-yellow.

**FLIGHT** Mid-sized raptor with head well projecting, wings short and relatively narrow [cf. 71], with rounded tips; tail noticeably short and broad-looking, helping to give rather more buteonine shape; wingspan 2.4 times total length. Rapid shallow beats and flat glides, mainly over short distances from one perch to another; also soars above trees at times. **Adult** Dominant feature in flight, above and below, is 'sandwich' tail with broad band of white between two of black; otherwise, mainly dark above but for paler areas on primaries and whitish tips to rump; and largely whitish below, apart from grey head and body, prominent black trailing edges to lightly barred flight-feathers, and whiter patch at base of primaries. **Juvenile/immature** Tail pattern similar in immature stages, except that juvenile's looks mainly whitish with dark subterminal band. Juvenile otherwise brown above with slightly paler primary bases and whitish head; and buff below without any prominent markings but for whiter primary bases and greyer secondaries. (See also 'Perched'.)

**CONFUSION SPECIES** When perched, size and shape, as well as general pattern on more barred individuals, rather similar to East African (Banded) Snake-eagle

[71], but that has longer tail, black bill and always more barring except as juvenile. Brown subadult can also be confused with adult Brown Snake-eagle [70] (much larger and less compact, with greyish-white cere and legs). As soon as Banded Snake-eagle's distinctive tail seen, whether perched or in flight, no question remains (though very different African Gymnogone [89] has much thinner central white band on black tail). Adult's flight pattern of dark body and whitish underwings with broad black trailing edges otherwise very similar to East African (Banded), but that has more barring on wing-linings and less white windows, while juvenile East African (Banded) lacks contrast between whitish primary bases and grever secondaries.

**VOICE** Less noisy than East African (Banded) Snake-eagle [71], and voice said to be used more in flight, but also regularly when perched, especially in early morning. Main calls comparable: loud rapid *kak-kak-kak-kak-ko-ko*, dropping in pitch at end, and mournful ringing *ko-waaa*.

**FOOD** Mainly small snakes, occasionally larger ones up to at least 75 cm, also water monitors, other lizards, and amphibians; other records include small rodents, fish, beetles, and a newly hatched tortoise. Still-hunts from tree perch, taking prey on ground and also snatching snakes from trees. Holds writhing snake in bill and carries it to perch, there crushing neck until dead and often holding it for some time before swallowing whole.

**SOCIOSEXUAL BEHAVIOUR** Generally solitary or in pairs. In display, male soars and circles high overhead, frequently calling, sometimes diving down with folded

wings from great height. Often brings snakes or frogs to female near nest. Copulation may follow tumbling fall, with claws interlocked, from nest-tree.

**BREEDING** Very few data, but these mostly indicate laying December–April, or possibly July in northeastern DR Congo, on which basis occupied nests likely mainly December–September. Small nest of thin twigs, c45–60 cm across and c15–25 cm deep, lined with green leaves, at c9–18 m in large waterside tree (often acacia), well inside canopy and almost always on or among creepers. (Older reports of larger structures either misidentified or indicate use of another raptor's nest.) Clutch 1. Incubation and fledging periods unknown.

**POPULATION** Little known. Despite much wider range, mostly less numerous than East African (Banded) Snake-eagle [71] and very vulnerable to clearance of riverine forest, as, for instance, in northeast Namibia, where only c14 pairs now estimated to remain.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 367–397 mm, ♀ 379–408 mm; ♂♀ tail 220–231 mm, tarsus 80–84 mm. **Weights** No data.

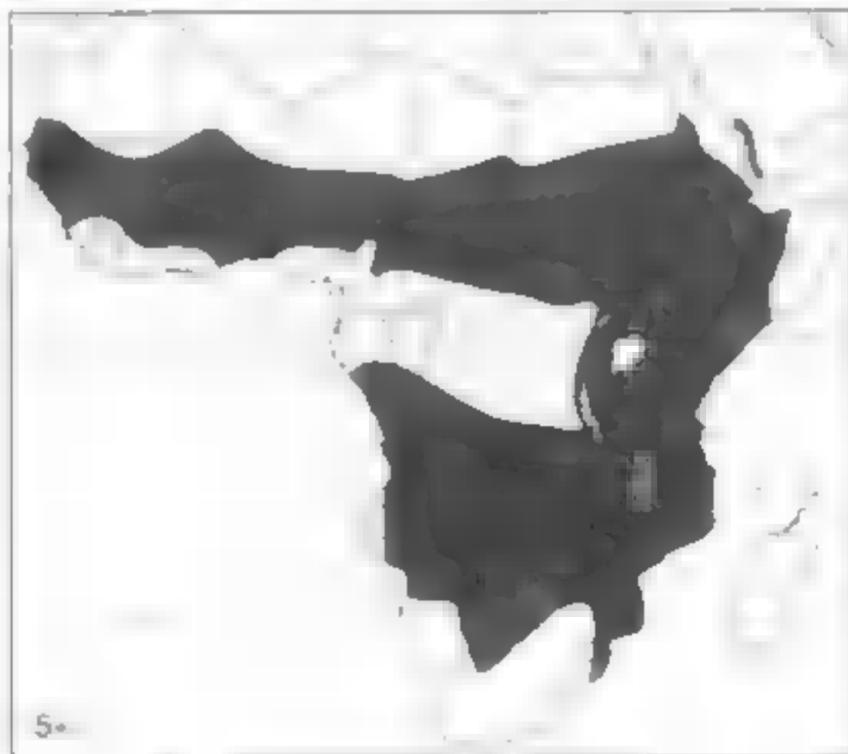
**REFERENCES** Benson & Benson (1977), Britton (1980), Brown & Hines (1987), Brown *et al.* (1982), Brown (1976b), Chapin (1932), Colebrook-Rohjent & Aspinwall (1986), Edwards (1985), Ginn *et al.* (1989), Gore (1980), Grimes (1987), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957–73), Maclean (1993), Mudge (1972), Pickford *et al.* (1989), Pinto (1983), Steyn (1982), Thiollay (1975a–b, c, 1978), Zimmerman *et al.* (1996).

## 73 BATELEUR *Terathopius ecaudatus* (Daudin, 1800)

Plate 23

Other name: Bateleur Eagle

**DISTRIBUTION** Afrotropical (22°N to 29°S); order 5+; extinct in some areas (e.g. much of former range in southern Africa) and decreased in others, but generally scarce to common. Much of sub-Saharan Africa and southwest Arabia: from southern Mauritania, Senegambia, south Mali and Guinea east to central Sudan,



Ethiopia and west Somalia, with extension into southwest Saudi Arabia and Yemen; thence south, except in forest regions, to Namibia, Botswana, northern and northeastern South Africa.

**MOVEMENTS** Generally considered sedentary, but resident pairs can need large home ranges (though only c40km<sup>2</sup>/pair in Kruger National Park) and, sometimes at least, adults as well as immatures clearly nomadic. Indeed, regular north-south movements may occur in West Africa and transequatorially in East Africa to avoid rains. In Kruger, immatures driven out by adults in breeding season, then wandering widely before returning in non-breeding season. Vagrants have reached Tunisia, Egypt, Israel and Iraq.

**HABITAT** Mainly open country from grassland to savannah and subdesert thornbush, but also woodland. Not forest or wetlands, but liable to be seen over such areas and any other types of habitat during long foraging journeys. Sea-level to 4,500 m, but not normally a mountain bird and mainly below 3,000 m.

**FIELD CHARACTERS** Aberrant snake-eagle (which is anatomically closer to vultures), largely black, grey/cream and rufous as adult, typical only in having thick neck and particularly obvious large cowed head; otherwise stumpy, 'tailless' and short-legged shape

dominated by exceptionally long wings (wings have some 25 secondaries, more than any other raptor); even eyes dark, not yellow. Perches very upright and, though spending much time on wing, has to remain perched in early mornings, late afternoons and cold or wet weather, while juveniles in particular stay for long periods near carrion. Sexes not dissimilar, but easily distinguished, and female also averages 6% larger; juvenile distinct; not fully adult until seven to eight years. **Adult male** Predominantly black with grey shoulders (edged whitish in fresh plumage) and, usually, chestnut mantle, back, rump and tail, including undertail-coverts. **Adult female** Distinguished from male by grey-brown (not black) greater coverts and black-tipped grey (not all-black) secondaries. **Cream morph adult** Up to c7% of adults have pale chestnut tails, and other chestnut areas replaced by cream to palest brown. **Juvenile** Longer-tailed and all brown, edged rufous above, with paler, tawnier head, brown eyes, greenish-blue cere and whitish feet. **Immature** In second-third years much as juvenile. In fourth year becomes sooty-brown, and sex evident in wing-markings; in fifth year first signs of chestnut and grey on back and shoulders; over this two-year period cere and feet turn yellow and then pink. **Subadult** In sixth to seventh years plumage blackens and chestnut increases; shoulders fully grey by eighth year. **Bare parts** Eyes brown at all ages. Adult bill black-tipped with yellow centre and red base, juvenile mainly pale grey-blue. Adult cere, bare facial skin and feet red, but all can temporarily fade to pink, pale pink or even yellowish when perched in shade or bathing, and flush reddest during excitement; juvenile cere and facial skin pale grey-blue to green-blue, feet greyish-white to greenish-white; at four to five years, cere, facial skin and feet turn yellow, then pink, and redden thereafter.

**FLIGHT** Rather large raptor whose disproportionately long, bow-shaped wings – pinched in at bases, broad across secondaries, and relatively narrow, pointed and upturned at tips – catch the eye so much more than the large head and very short tail that the flying bird appears to be all wing; adult's feet extend beyond tail, but juvenile's fall about 5 cm short of up to 50% longer tail; feet start to exceed tail about fifth year; adult wingspan 2.9 times total length. Takes off with unusually fast shallow beats; thereafter sails about majestically at 50–60 km/h, rocking from side to side, with wings in marked dihedral and hardly ever flapped. Although usually flying quite low, also soars and circles high. **Adult male** Above, black with chestnut back and tail, grey forewings; below, black head and body, chestnut tail, and white wing-linings and black flight-feathers except for greyish-based primaries. **Adult female** Differs from male in black-tipped grey secondaries above, and underwings largely white with black tips and trailing edges. **Juvenile** Broader-winged and, especially, longer-tailed: mainly brown, with paler head and undersides of flight-feathers. **Immature** See 'Perched'.

**CONFUSION SPECIES** Whether perched or flying, adults and older immatures quite unmistakable, though very differently shaped Jackal and Augur Buzzards [21], 212] sometimes misidentified as Bateleurs because of combination of black, white and chestnut (in different patterns). Juveniles and immatures in second to third years hardly less distinctive in flight, but when perched

could be confused – because of large head, brown plumage and whitish feet – with Brown Snake-eagle [70] (yellow eyes, longer legs, tips of wings reach tip of banded tail: see fig. 31 on p. 432) or even juveniles of Beaudouin's and Black-chested Snake-eagles [68, 69] (additionally, and respectively, darker brown all over and much more rufous below).

**VOICE** Usually silent, except in courtship, aggression or anxiety. Main calls, whether perched or in aerial displays, or when pirating other raptors, far-carrying and variously phoneticised as loud raucous *schaanaa-aw* or resonant barking *kow-aw*, with head thrown back, even in flight, at highest intensity like African Fish-eagle [44]. Distraction display accompanied by subdued barking chatter, *ka-ka-ka-ka...*; other softer calls uttered when perched near nest.

**FOOD** Very varied, both live and dead: mostly kills mammals and birds, some reptiles; also takes carrion, insects (alate termites to locusts), occasionally birds' eggs, crabs. Considerable range of foods varies greatly also in size. Mammals (shrews to smallest antelopes) and birds (starlings to eagle owls, hornbills and small bustards) together usually make up 70–90% of prey items: largest birds killed 1.2+ kg and dikdiks (tiny antelopes) up to 4 kg. (Bateleur's long middle toes have been cited as indications that species originally a bird-eater, but rather small RSD favours mammal-eating.) Takes lizards and some snakes (up to size of monitors) but, unlike typical snake-eagles, does not specialise on snakes, or even reptiles in general, and these form only small percentage of prey. Carrion includes stranded and dead fish, and many other forms (roadkill birds to large mammals). Forages over huge range of 55–200 km<sup>2</sup>, spending up to eight to nine hours, or up to 80% of daylight, on wing and capable of covering perhaps 300–500 km in day (one-third of all Bateleur nest failures result from direct predation on nestlings during adults' absence): mostly flies quite low and straight, scanning ground, periodically banking and retracing section of track when possible food sighted, then descends in tight spiral to check it out. Very effective discoverer of carrion at all times and often the first species to arrive at large carcasses or roadkills. Kills most live prey on ground with steep stoop on part-closed wings, or slow drop on raised wings, but can also take birds in flight and sometimes pirates food from other raptors. Hunts insects by walking on ground, particularly after grass fires. Will patrol roads for small corpses killed by traffic. Juveniles much more often than adults at large carrion.

**SOCIOSEXUAL BEHAVIOUR** Often solitary, but juvenile may accompany one or both parents for first three months; loose congregations of 40–50 or more, mainly immatures, may occur in rich feeding areas, such as bush fires, recently burnt areas and temporary floods, and at termite emergences. In courtship flights, male dives at female, sometimes with dangling legs, and she rolls over to present claws. Remarkable wing noise, like flapping sail, audible over considerable distance during dives and much less frequent lateral rolling. Chasing flights may also involve immatures. Talon-grappling usually involves territory-owner and intruder (see fig. 32).

**BREEDING** September–May in West Africa, any month in East Africa, but chiefly December–August in southern



**Fig. 52.** *Buteleurus Terathopius ecaudatus* [73]. Talon-grappling like this was long assumed to be part of aerial displays between pairs of raptors of many species, but in most, if not all, cases it occurs in the course of fights between one of a nesting pair and an intruder.

Africa. Small but solid nest of thin twigs, 60–70 cm across and 30–40 cm deep, lined with green leaves, at 10–15 m (7–25 m) in large acacia or other tree, usually well inside canopy in main or lateral fork, sometimes on old base of another bird, and often beside watercourse. Clutch 1. Incubation 52–59 days. Fledging 93–194, usually 110–112, with dependence for up to 4 months.

**POPULATION** On conservative average of 150 km<sup>2</sup>/pair, total population could be around 180,000 birds, including immatures. But species has seriously declined in some parts, particularly in southern Africa, where 80% decline since mid 1940s in South Africa; original Transvaal population of 2,000–2,500 pairs reduced by early 1980s to 420–470 pairs, though total of 600 pairs estimated in 1990s. In southern Africa as whole, factors responsible include habitat destruction, lack of carrion for juveniles, poisoned carcasses, shooting, nest disturbance, and possibly pesticides (though three eggs analysed held low, subcritical levels of DDT metabolites). Some of these threats apply just as much in other parts of Africa and it seems more likely that total population is now less than 100,000 birds.

**GEOGRAPHICAL VARIATION** Monotypic. Cream morph possibly commoner in drier regions.

**MEASUREMENTS** ♂ wing 482–553 mm, ♀ 530–559 mm; ♂ tail 98–124 mm, ♀ 105–115 mm; ♂ tarsus 67–75 mm, ♀ 72–75 mm. **Weights** 1.8–3.0 kg (10 averaged 2.2 kg).

**REFERENCES** Benson & Benson (1975), Britton (1980), Brown (1953, 1955), Brown & Cade (1972), Brown *et al.* (1982), Colebrook-Robjent & Aspinwall (1986), Cramp & Simmons (1980), de Kock & Watson (1985), Gann *et al.* (1989), Gore (1990), Grimes (1987), Herholdt & de Villiers (1991), Hustler (1985), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Maclean (1993), Moreau (1945), Nikolaus (1987), Ottoson (1993), Pickford *et al.* (1989), Smeenk (1974), Snelling *et al.* (1984), Steyn (1965a, 1980a, 1982), Tarboton & Allan (1984), Thiollay (1978c, 1985d), Tree (1978), Verdon (1979), Watson (1985, 1987, 1988, 1989, 1990a, b), Wilson (1982), Zimmerman *et al.* (1996).

## 74 CRESTED SERPENT-EAGLE *Spilornis cheela* (Latham, 1790)

Plate 26

**DISTRIBUTION** Indomalayan (35°N to 9°S); order 6; widespread and generally fairly common to common. Indian subcontinent and southeast Asia to Malaysia and western Indonesia (but see Geographical Variation); breeds Pakistan (Sind and North West Frontier Province eastwards), Kashmir, Nepal, Bhutan, Bangladesh, and Assam south almost throughout India to Sri Lanka, and east through Burma to south China (north to Yunnan, Guizhou, Hunan and lower reaches of Chang Jiang river, also including Hainan) and Taiwan (but not southernmost Ryukyu Islands; see [86]); thence south through Andaman and possibly Nicobar Islands [see also 75–77], Thailand, all countries of Indochina, and peninsular Malaysia, to Sumatra (with Batu, Pini and Bangka, but not other satellite islands [see 78–80]), Borneo (but not Belitung or Natuna, nor upland north [see 81–82]), Java (with Madura, but not Bawean [see 83]), Bali, and Calamians, Palawan and Balabac (but not Sulawesi or rest of Philippines [see 84–85]). (More of the island 'races' may yet justify being raised to species level; see Geographical Variation.)

**MOVEMENTS** Generally considered sedentary, but at least immatures nomadic and possibility of some local migrations indicated by seasonal changes in frequency, while altitudinal movements also recorded in some parts.



**HABITAT** Wide variety of forest and woodland – evergreen or deciduous, wet or dry, closed or open, lowland or mountain, ranging from canopy of primary rainforest to secondary growth and plantations – but also wooded savannah, timbered ravines and waterside galleries; at

least in Andaman (and Nicobar?) Islands, tidal creeks and mangrove swamps. Hunts around native villages and in tea plantations and other cultivation with scattered trees. Sea-level to, commonly, 1,500 m, often 2,000 m, sometimes 3,000 m; recorded at up to 3,350 m in Nepal in October.

**FIELD CHARACTERS** Smallish to fairly large serpent-eagle, as adult mainly dark, but shoulders and abdomen liberally white-spangled, and tail and underwings strikingly banded, with short bushy crest that gives characteristic flat-crowned and big-headed look (when erected in alarm, frames whole face), bare yellow lores, moderately long wings, medium-length tail, and unfeathered legs. Fairly tame. Usually perches quite upright, and openly when looking for prey, but often partly hidden by foliage and so often unobtrusive when settled; sometimes flicks tail laterally, especially on alighting; wing-tips usually just exceed light tail-band. Sexes similar, but female of most races averages 4–6% larger (up to 13–17%) and probably considerably heavier; juvenile quite different, much as adult by second year, but apparently still pale-edged, looking more barred, often with juvenile tail; tail- and underwing-bands tend to become whiter, and upperparts and breast darker, with increasing age? Extreme geographical variation in size and colour saturation between five continental and eight insular races, together with 12 other related island forms here treated as distinct species (see Geographical Variation and 75–86); following descriptions summarise the mainland races only (of which Malaysian is considerably smaller than rest).

**PERCHED Adult** Crown and bushy nape black, latter variously tawny-edged and white-flecked; otherwise, mainly dark brown above (paler from Burma eastwards), apart from white spangling on lesser and some median coverts and slightly paler band on blacker flight-feathers; black tail with thin whitish tip and broad central band, greyish-white on top and white underneath; throat and cheeks vary from black (north India) to grey or brown, while light brown breast may be closely darker-banded (north India), finely vermiculated (Burma eastwards) or almost plain (south India, Sri Lanka); belly, thighs and crissum more rufous-brown with fine dark bars and black-edged white spots that vary in size, shape and distinctness in different populations (strongest in India and peninsular Malaysia, more barred than spotted from Burma to Indochina, less distinct in south China). **Juvenile** Crown, head-sides and bushy nape buff to whitish, closely scaled with black, apart from bold black patches behind eyes; otherwise, dark brown to blackish and some redder-brown above, all variously blotched, streaked and edged with white (this much reduced with wear); dark brown tail has whitish tip and two clear pale bands, mottled brownish on top and greyer underneath; buff-white underbody with sparsely scattered brown drop-shapes and streaks on breast and flanks, and variably conspicuous rusty barring on lower flanks, thighs and crissum. **Bare parts** Adult eyes yellow, juvenile grey-brown, becoming pale yellow. Cere and lores yellow (brighter when breeding). Legs duller yellow.

**FLIGHT** Medium-sized to largish raptor with big head, longish tail usually held closed, and broad and very round-tipped wings; wingspan averages 2.2 times total length (but proportions vary between races). Flies with

strong beats and short glides on level or slightly raised wings; soars with wings held straight out in shallow V. **Adult** Looks all dark above, with blacker head and only slightly paler strip along flight-feathers, but for bold broad greyish-white band in middle of tail (sometimes traces of second band by tail-coverts); below, this band and corresponding broad strip, curved at ends, running whole length of flight-feathers, are both white and give highly distinctive pattern; bases of primaries show 2 additional whitish lines, but otherwise whole bird often looks fairly uniformly dark underneath, although underbody and wing-linings paler and more or less white-spangled, while head and chest rather blacker in north India. **Juvenile** Black-scaled buff-white head with bold black patches behind eyes; dark brown tail with thin pale tip and two mottled whitish bands (traces of third at base); otherwise, dark brown above, variably streaked and edged with white, and rather pale below because only sparse dark streaks on buff-white breast and wing-linings (sometimes forming suggestion of brown band across chest), and obscure dark barring on flight-feathers with slightly more prominent trailing edges and wing-tips; but two dark curves on primary coverts can be distinctive.

**CONFUSION SPECIES** Head shape, yellow lores and underbody-spangling when perched and, especially, combination of broad white wing- and tail-bands in flight make adult unmistakable over most of range, though local races in Andamans (possibly also Nicobars) and Borneo need to be distinguished from related endemic species [see 75–77 and 82]. Juveniles could be confused with pale-headed Short-toed Snake-eagle [67] (smaller head, no yellow lores or black patches behind eyes, longer thinner wings held flatter in soaring, whiter-looking tail with narrower dark bars); and with immatures of Changeable, Mountain and other hawk eagles [297, 238, etc.], but these also lack black patches behind eyes (though cf. juvenile Rufous-bellied Hawk Eagle [233]) and yellow lores, and have fully feathered legs, differently shaped wings held either level or more markedly raised, thinner dark tail-bars apart from broad subterminal band (though cf. subadult Mountain Hawk Eagle with its broad pale and dark bands), and different calls.

**VOICE** Noisy in aerial displays, especially before and during breeding season, but often at other times too; also calls when perched. Loud, shrill ringing *pi-pi-whereeah-whereeah* among commonest, most characteristic, attention-grabbing and easily recognised raptor sounds of whole Indomalayan region: usually two to three short introductory undertones and then single, double or even treble scream – much higher-pitched, louder, and descending – which is often the only part heard at distance.

**FOOD** Mainly reptiles, some frogs, occasionally small rodents, rarely sick or injured birds; in Andaman Islands, crabs and one eel recorded. Snakes are chief prey (has even been caught in trap baited with dead snakes), but lizards also taken. Commonly still-hunts from tree perch beside clearing or stream: this may be partly hidden fork or foliated branch, or fully exposed snag or tree top, where it will sit motionless for long periods before sighting prey and dropping to ground. Possibly also perch-hunts within canopy for arboreal snakes and lizards, but does not forage in flight.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, often, in pairs, sometimes trios, or family parties of three. High-circling, whether single or mutual, regular at any season and often accompanied by noisy calls audible even when bird too high to pick out. Other aerial displays more irregular, and sometimes seem half-hearted, but variously include dives, rolling-over, talon-showing, shivered wings and, most characteristically, 'shuttlecock-flight' with head, wings and tail all bent up.

**BREEDING** Varies with altitude and latitude, eggs being laid in dry season in north of range: in India, March–July in northern hills, but February–May in plains and may start as early as December in south; also February onwards in Burma, but eggs recorded in most months February–November in Java. Relatively small stick nest, 50–60 cm across and 10–30 cm deep, lined with green leaves, at 6–20+ m in central fork of forest or open woodland tree, often near stream or marsh. Clutch 1 (1–2?). Incubation c55+ days. Fledging c60 days.

**POPULATION** Distribution limits enclose 8–9 million km<sup>2</sup> and, despite local declines, species is generally considered widespread and common, sometimes probably the commonest 'eagle' (e.g. 'throughout the Greater Sundas', which total 1.35 million km<sup>2</sup>, or approaching one-sixth of entire range). Breeding sites can be as little as 1.5–2 km apart, and home ranges of only 5–6 km<sup>2</sup> have been recorded, but these are optimum figures which could not apply over the whole range. An average of only 1 pair/100 km<sup>2</sup> would give population of 160,000–180,000 adults, without non-breeders or immatures, and densities four times higher would still be in the six-figure bracket. Found in variety of forested to lightly wooded country, including disturbed areas and plantations, and presenting little threat to poultry or other human interests, its future seems reasonably assured.

**GEOGRAPHICAL VARIATION** This is the basic taxon in the most complex of all raptor genera: usually only five more, sometimes only three, are considered distinct species, up to 25 others then being regarded as races of this one, but the differences between neighbouring island groups are marked and without constant trends, while in Andamans, Nicobars (?) and Borneo second-wave colonists do not interbreed with their precursors (see discussion, pp. 73–74). We treat a total of 15 forms as full species, leaving 14 others as races of *Spilornis cheela*.

*S. c. cheela* (Pakistan, Kashmir, Nepal, Bhutan, Bangladesh, north and west Assam, India south to c25°N) Largest race; dark brown above, cheeks blackish-grey, throat blackish, breast thinly barred, belly conspicuously spotted, one tail-band.

*S. c. melanotis* (India south from c25°N) Clinally smaller; cheeks grey, throat not blackish, breast plain, second tail-band appearing at base, band on secondaries greyer.

*S. c. spilogaster* (Sri Lanka) Smaller again; cheeks and throat grey, breast browner.

*S. c. burmanicus* (east Bangladesh?, south and east Assam, Burma, most Thailand, Indochina except Tonkin) Size between *cheela* and *melanotis*; paler, cheeks and throat browner, breast finely vermiculated, belly and thighs more barred.

*S. c. ricketti* (Tonkin, south China) Averages larger

than *burmanicus*; paler brown above, breast thinly barred, rest of underparts less spotted and barred. *S. c. rutherfordi* (Hainan) Smaller than adjacent *ricketti*; darker and more clearly marked.

*S. c. hoyi* (Taiwan) Size of adjacent *ricketti*; much darker, cheeks and throat blackish, breast nearly plain, rest of underparts clearly spotted.

*S. c. davisoni* (Andamans, ?Nicobars) Smaller, like *spilogaster*; paler and more buff below, throat and breast finely dark-barred, second tail-band.

*S. c. malayensis* (south Tenasserim, peninsular Thailand and Malaysia, Anambas, north Sumatra) Distinctly smaller than adjacent *burmanicus*; cheeks and throat darker brown, underparts more clearly spotted and barred white.

*S. c. batu* (south Sumatra, Batu) Smaller still than adjacent *malayensis*; and generally darker.

*S. c. richmondi* (southern Borneo) Similar in size to *batu*; considerably paler brown above, cheeks and throat grey, breast more rufous and unbarred.

*S. c. pallidus* (lowland northern Borneo) Larger and longer-tailed than *richmondi*; also darker.

*S. c. bido* (Java, Bali) Medium-sized, larger than adjacent *batu*; upperparts and breast all very dark brown, cheeks and throat blackish, shoulders and belly clearly white-spotted.

*S. c. palawanensis* (Palawan chain from Balabac to Calamian) Larger again, medium-sized; breast barred with dusky-rufous.

**MEASUREMENTS** *S. c. cheela* ♂ wing 468–510 mm, ♀ 482–532 mm; ♂ tail 295–305 mm, ♀ 299–315 mm; ♂ tarsus 100–105 mm, ♀ 102–115 mm. *S. c. melanotis* ♂ wing 357–440 mm, ♀ 424–481 mm. *S. c. spilogaster* ♂ wing 355–389 mm, ♀ 384–402 mm. *S. c. burmanicus* ♂ wing 405–455 mm, ♀ 436–474 mm. *S. c. ricketti* ♂ wing 430–455 mm, ♀ 470–490 mm. *S. c. rutherfordi* ♂ wing 398–411 mm, ♀ 405–430 mm. *S. c. hoyi* ♂ wing 470–481 mm. *S. c. davisoni* ♂ wing 374–407 mm. *S. c. malayensis* ♂ wing 348–380 mm, ♀ 368–394 mm. *S. c. batu* ♂ wing 329–352 mm, ♀ 340–354 mm. *S. c. richmondi* ♂ wing 324–338 mm, ♀ 336–360 mm. *S. c. pallidus* ♂ wing 335–358 mm, ♀ 365–392 mm. *S. c. bido* ♂ wing 384–392 mm. *S. c. palawanensis* ♂ wing 380–410 mm. **Weights** 420 g–1.8 kg recorded, but data inadequate (*pallidus* 675–925 g, but this is one of smallest races and odd records for larger forms indicate some may be two to three times as heavy).

**REFERENCES** Ali & Ripley (1978), Amadon (1964, 1974), Amadon & Bull (1988), Brazil (1991), Brown (1976, 1998), Cheng Tso-hsin (1987), Deignan (1945, 1963), Dickinson *et al.* (1991), Etchécopar & Hie (1978), Henry (1998), Inskipp & Inskipp (1991), King *et al.* (1975), Kooiman (1937), Lekagul & Round (1991), MacKinnon & Philipps (1993), Medway & Wells (1976), Meyer de Schauensee (1984), Naoroji (1985), Naoroji & Monga (1985), Rand & Rabor (1960), Roberts (1991), Severinghaus & Blackshaw (1976), Smythies (1981, 1986), Thiollay & Meyburg (1988), Tikader (1988), Wilkinson *et al.* (1991a/b), van Marle & Voous (1988).

## 75 ANDAMAN SERPENT-EAGLE *Spilornis elgini* (Blyth, 1863)

Plate 27

Other name: Andaman Dark Serpent-eagle

**DISTRIBUTION** Indomalayan (13.5°N to 10.5°S); order 3–4; common in restricted island range. Endemic to Andaman Islands in Bay of Bengal: North Andaman through to Little Andaman in south (thus sympatric with local race *davisoni* of Crested Serpent-eagle [74]).



**MOVEMENTS** Presumed to be sedentary, but several islands contiguous and immatures could easily wander.

**HABITAT** Forest. 'Forest clearings, hillsides covered with scattered trees' (Ali & Ripley). Sea-level to 700 m. (Local race *davisoni* of Crested Serpent-eagle [74], or Andaman Pale Serpent-eagle, though more restricted to tidal creeks and mangroves, also soars over inland areas.)

**FIELD CHARACTERS** Smallish dark serpent-eagle with short bushy crest that gives flat-crowned and big-headed look typical of genus, bare yellow lores, moderately long wings, medium-length tail and unfeathered legs. Perching behaviour perhaps similar to that of Crested Serpent-eagle [74]; wing-tips reach or exceed distal tail-bar. Sexes similar, but female probably slightly larger.

**PERCHED Adult** Mainly dark chocolate-brown, above and below, spangled with small white spots and feather-edges on body and wing-coverts; neck-sides greyer and undertail-coverts more barred; barely blacker crown and crest edged buff to rufous; tail with pale tip and two thin bars that are lighter brown above and grey below.

**Juvenile** Not dissimilar, if paler (milk chocolate rather than plain), apart from much whiter head with dark feather-centres, dusky patches behind eyes, and dark-streaked throat; otherwise paler brown with buff edges above, white spots on wing-coverts and underparts, becoming more buff-banded on belly and crissum; tail with three pale bars slightly less narrow than adult's.

**Bare parts** Adult eyes bright yellow, juvenile grey-brown, becoming yellow. Cere and lores bright yellow, juvenile probably paler. Legs yellow.

**FLIGHT** Mid-sized raptor with big head, medium-length tail and broad round-tipped wings; wingspan 2.3 times total length. No details of flight action, but perhaps similar to Crested Serpent-eagle [74]. **Adult** Looks very dark above, apart from some paler edges and spots at close range, with whitish tip and two thin pale bars on

tail; and hardly less dark below, despite finely white-spotted wing-linings and abdomen, barred crissum, and pale trailing edges and thin greyish-white lines on flight-feathers (at least three clear, sharpest on primaries) and tail (two). **Juvenile** Pattern much like adult, but paler chocolate with black-patterned whitish head, more barring on lower abdomen, three slightly broader pale bars on tail and four to five on wings.

**CONFUSION SPECIES** Head shape, yellow lores and spangling exclude all but similar-sized local race *davisoni* of Crested Serpent-eagle [74], somewhat restricted to tidal creeks and mangroves but occurring over inland areas: adult *davisoni* much paler, especially below, and has single broad central tail-band (traces of second at base), while underwings show one main white band running whole length and two others that are wide only on primaries; juvenile likewise far paler below, including whole wings – light with dark markings, rather than other way around – and tail-bands also broader.

**VOICE** Clear whistles, quite different from shrill ringing screams of Crested Serpent-eagle [74].

**FOOD** Some snakes, but apparently varied diet includes birds, frogs, lizards and rats (whereas only recorded food for local race *davisoni* of Crested Serpent-eagle [74] is crabs and one eel). Apparently still-hunts from tree perch.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, often, in pairs. Single or mutual high-circling accompanied by whistling calls.

**BREEDING** No information.

**POPULATION** Although this is commonest Andaman raptor, 'sometimes reaching surprisingly high densities', total land area of the islands is only 6,500 km<sup>2</sup>. Thus, average density of 1 pair/18 km<sup>2</sup> would be necessary to give four-figure population of breeding adults. Any forest species with such restricted distribution must be at risk from tree clearance, especially as human population of Andaman Islands has increased tenfold in past half-century.

**GEOGRAPHICAL VARIATION** Monotypic. Sympatric with Andaman race *davisoni* of Crested Serpent-eagle [74], but not interbreeding. This is a forest species probably derived from ancient common stock, while *davisoni* presumably descended from more recent second-wave colonists that have tended to be restricted by competition to tidal creeks and mangroves.

**MEASUREMENTS** ♂ wing 372–374 mm (two), ♀ 370 mm (one); ♂ tail 220–226 mm, ♀ 213 mm; ♂♀ tarsus 81–88 mm. **Weights** No data.

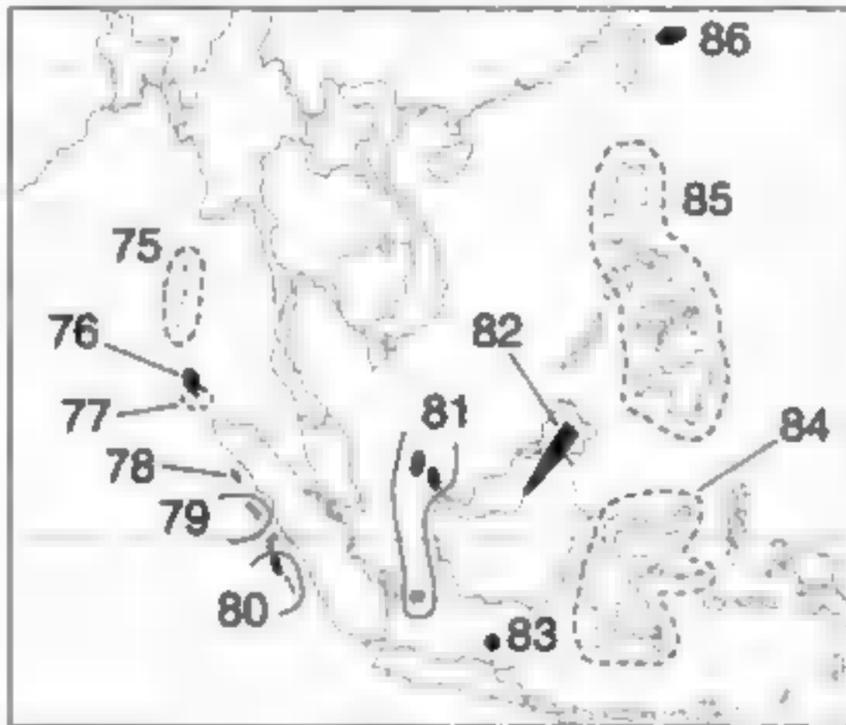
**REFERENCES** Ali & Ripley (1978), Brown (1976b), Butler (1899), Collar & Andrew (1988), Ripley (1982), Tikader (1988).

## 76 CENTRAL NICOBAR SERPENT-EAGLE *Spilornis minimus* Hume, 1873

Plate 26

Other names: Nicobar Crested Serpent-eagle, Small Serpent-eagle (when *klossi* combined)

**DISTRIBUTION** Indomalayan (e8°N); order 2; status unknown, but range very limited. Endemic to central group of Nicobar Islands in Bay of Bengal: Terasa Dweep, Camorta, Katchall, Trinkat and Nancowrie.



**MOVEMENTS** Presumed to be sedentary.

**HABITAT** 'Forest near rivers, not frequenting the shores or clearings' (Ali & Ripley). Mostly below 100 m.

**FIELD CHARACTERS** Tiny pale serpent-eagle with short bushy crest giving flat-crowned and big-headed look typical of genus, bare yellow lores, relatively short wings, medium-length tail and unfeathered legs. Perching behaviour perhaps similar to that of Crested Serpent-eagle [74]; wing-tips probably just exceed tail-band. Sexes similar, but female averages 8% larger (up to 18%); juvenile distinguishable.

**PERCHED Adult** Mainly pale brown to grey-brown, plain greyish on head-sides, neck, upper mantle, throat and breast, thus throwing white-flecked black crown and crest into sharp relief; otherwise medium brown above with some pale edges to scapulars and spangling on wing-coverts, and whitish tips to blacker-ended flight-feathers; thinly whitish-tipped black tail has broad greyish-white central band (white underneath) and paler area at base (showing white at edges underneath); belly, thighs and crissum more cinnamon than breast, and barred (rather than spotted) with white. **Juvenile** Inadequately known (may be subadult rather than juvenile): apparently rather similar to adult, but for broad buff tips to crest, upperbody and wing-coverts, and full second whitish band on tail. **Bare parts** Adult eyes yellow, immature grey-brown, becoming yellow. Cere and lores bright yellow, immature perhaps paler. Legs yellow.

**FLIGHT** Smallish, compact raptor, smaller than most buteos, with big head, broad round-tipped wings, and medium-length tail; wingspan 2.2 times total length. No details of flight action, but perhaps similar to Crested Serpent-eagle [74]. **Adult** Brown to pale grey-brown above, apart from some lighter edges and spots at close

range, with sharply contrasting black crown and nape, thin whitish tip and broad central bar on blacker tail, and comparable pattern on flight-feathers with black subterminal band standing out against grey-brown mid-section; below, grey-brown underbody and wing-linings, inconspicuously marked with white on belly, thighs and crissum especially, look much paler than boldly patterned tail and flight-feathers dominated by broad white central band in each case (like most other *Spilornis* [see 74], except subsidiary black band at bases of primaries shorter and incomplete, leaving larger basal patches of white, and edges of second tail-bar showing at base beside undertail-coverts). **Juvenile** Inadequately known (see above), but full second tail-bar and traces of third at base.

**CONFUSION SPECIES** Generally unmistakable, but possibility of occurrence of one of two mainland races of Crested Serpent-eagle [74]: (a) uncertain whether Andaman *davisoni* found in Nicobars, but that is clearly larger, with longer tail and 16–32 cm greater wingspan (18–31% more), also more buff below with finely dark-banded breast, possibly narrower white wing-band and more definite basal tail-band; and (b) Malaysian *malayensis*, which has been recorded once in Nicobar group but, though averaging smaller than *davisoni*, is distinctly darker brown with fine-banded breast and more contrasting white spots and bars; juveniles of both correspond to description given under Crested Serpent-eagle. See also Great Nicobar Serpent-eagle [77] and consider possibility of vagrant hawk eagles [237–238, 242–243].

**VOICE** Not described.

**FOOD** Stomachs of specimens 'contained remains of lizards, portions of a chicken, and a crab' (Ali & Ripley).

**SOCIOSEXUAL BEHAVIOUR** No information.

**BREEDING** No information.

**POPULATION** Current status unknown, but central Nicobars total little more than 600 km<sup>2</sup>; unusually high density would be necessary for population to reach three figures.

**GEOGRAPHICAL VARIATION** Monotypic; Amadon & Bull 'tentatively' regarded *klossi* (Great Nicobar Serpent-eagle [77]) as conspecific, but that is apparently smaller still, with relatively shorter tail and legs, and has plain underparts and distinct head and tail patterns. Such differences are recognised by the species status commonly given to *klossi*, while *minimus* is often treated as race of Crested Serpent-eagle [74]. These are two of seven small to very small forms endemic to the series of islands that run down the east side of the Bay of Bengal and Indian Ocean from Andaman to Mentawai (off central Sumatra): six are markedly different in various ways from the Crested Serpent-eagles of the adjacent mainland, and from each other, and have probably evolved from separate colonisations; certainly there is little chance of their mixing, and it seems more realistic and more useful zoogeographically to treat them as distinct species. (See also pp. 73–74.)

**MEASUREMENTS** ♂ wing 257–291 mm, ♀ 288–304 mm; ♂♀ tail 191–192 mm, tarsus 75–77 mm. **Weights** No data.

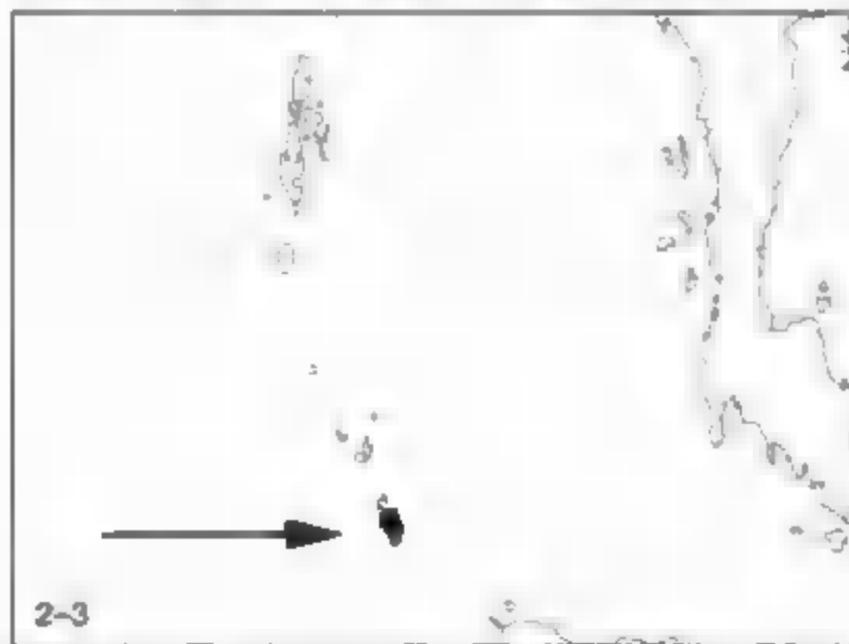
**REFERENCES** Ali & Ripley (1978), Amadon & Bull (1988), Butler (1899), Richmond (1903), Ripley (1982), Saha & Dasgupta (1980), Tikader (1988).

## 77 GREAT NICOBAR SERPENT-EAGLE *Spilornis klossi* Richmond, 1902

Plate 27

**Other names:** (Southern) Nicobar Serpent-eagle, Small Serpent-eagle (when combined with *minimus*)

**DISTRIBUTION** Indomalayan (7°N); order 2–3; possibly common, but range very limited. Endemic to Great Nicobar, largest and most southerly of Nicobar Islands in Bay of Bengal. (See also map p. 461.)



**MOVEMENTS** Presumed to be sedentary.

**HABITAT** Apparently restricted to primary forest. Sea-level to 600 m.

**FIELD CHARACTERS** Minute brown serpent-eagle, smallest of genus, with short bushy crest giving typical flat-crowned and big-headed look, bare yellow lores, and unfeathered legs, but relatively short-looking wings and tail. Described as secretive but confiding, perching inside forest; behaviour perhaps comparable to that of Crested Serpent-eagle [74]; wing-tips probably just exceed distal pale tail-band. Sexes similar, but female up to 12% larger; juvenile or immature distinguishable.

**PERCHED Adult** Black crown with cinnamon-tipped crest, clear grey cheeks and ear-coverts, suggestion of darker grey malar streaks and median throat-stripe, and pale yellow-brown collar on back and sides of neck; otherwise mainly dark brown above with scattered white tips, especially on wing-coverts, and blacker primaries; thinly whitish-tipped black tail has two unevenly spaced brownish bands, so that black parts appear as dark subterminal and narrower bars on basal half; breast rich cinnamon-buff, shading into paler buff and whitish on flanks, thighs, belly and crissum (no barring or spotting). **Juvenile** Inadequately known (may be subadult rather than juvenile); apparently rather similar to adult, but for broad buff tips to crown, crest, upperbody and wing-coverts, and third paler band on tail. **Bare parts** Adult eyes yellow, immature brownish-grey. Adult cere and lores yellow, immature greenish-yellow. Adult legs yellow, immature dirty yellow.

**FLIGHT** Smallish, compact raptor, smaller than most buteos, with big head, broad round-tipped wings, and medium-length tail; wingspan 2.3 times total length. No details of flight action, but perhaps similar to Crested Serpent-eagle [74]. **Adult** Mainly darkish brown above, with some lighter edges on back and wing-coverts at close range, but black crown and more cinnamon nape, grey cheeks, thin whitish tip and two brown bars on blacker tail, and comparable pattern on flight-feathers; in contrast, much paler below, with greyish head (suggestion of throat-stripes), rich cinnamon-buff breast, shading into paler buff and whitish on wing-linings and lower abdomen; flight-feathers and tail not dominated by single white band as on many other *Spilornis* [see 74], but look more barred black and brownish-white (two pale bands and traces of third at bases leave the distal black on secondaries and tail looking like broader subterminals, while broadly black-tipped outer primaries have mainly white bases with only one dusky bar across). **Juvenile** Inadequately known (see above), but three pale tail-bars; flight-feathers and tail whiter below, with thinner and browner barring, less effect of dark tips on primaries and bold subterminal bands on secondaries and tail.

**CONFUSION SPECIES** Generally unmistakable, but possibility of occurrence of mainland races of Crested Serpent-eagle [74]; see discussion under Central Nicobar Serpent-eagle [76] and consider possibility of vagrant hawk eagles [237–238, 242–243].

**VOICE** Not described.

**FOOD** Little known, but probably mainly reptiles, rodents and birds. Stomach contents of specimen included lizards, rats, a small bird and an Emerald Dove *Chalcophaps indica*.

**SOCIOSEXUAL BEHAVIOUR** No information.

**BREEDING** No information.

**POPULATION** Great Nicobar is only 860 km<sup>2</sup> in extent, but 80% is undisturbed primary forest. Species reported locally to be 'common', but recorded only twice in recent survey, and high density would be necessary for population to reach three figures.

**GEOGRAPHICAL VARIATION** Monotypic, though Amadon & Bull 'tentatively' regarded this as conspecific with Central Nicobar Serpent-eagle [76] (which see for discussion).

**MEASUREMENTS** ♂ wing 257–260 mm, ♀ 263–289 mm; ♂♀ tail 165–197 mm, tarsus 65–75 mm. **Weights** No data.

**REFERENCES** Ali & Ripley (1978), Amadon (1964, 1974), Amadon & Bull (1988), Butler (1899), Richmond (1903), Ripley (1982), Saha & Dasgupta (1980), Tikader (1988).

**78 SIMEULUE SERPENT-EAGLE**  
*Spilornis abbotti* Richmond, 1903

Plate 26

Other name: Simalur Serpent-eagle

**DISTRIBUTION** Indomalayan (3°N to 2°N); order 3-?; possibly not uncommon, but range very limited. Endemic to Simeulue, 120 km off northwest Sumatra. (See map p. 461.)

**MOVEMENTS** Presumed to be sedentary.

**HABITAT** Wooded country. Island is mainly below 250 m, but rises to 567 m, with hardwood forest slopes above terraced cultivation.

**FIELD CHARACTERS** Small brown serpent-eagle with short bushy crest giving flat-crowned and big-headed look typical of *Spilornis*, bare yellow lores, medium-length wings and tail, and unfeathered legs. Perching behaviour perhaps comparable to that of Crested Serpent-eagle [74]; wing-tips probably just exceed tail-band. Sexes similar, but female up to 10% larger; juvenile not described but presumably distinguishable.

**PERCHED Adult** Dark purplish-brown above, with white-flecked black crown, white-spangled blackish shoulders, and black primaries; tail black with relatively narrow greyish-white central band and thin whitish tip; below, all brown apart from obscure dusky vermiculations on breast and thinly black-edged white barring on flanks, thighs, belly and crissum. **Juvenile** No description. **Bare parts** Adult eyes, cere, lores and legs yellow.

**FLIGHT** Mid-sized raptor with big head, broad round-tipped wings, and medium-length tail; wingspan 2.2 times total length. No details of flight action, but perhaps comparable to Crested Serpent-eagle [74]. **Adult** All dark above, apart from relatively narrow whitish central tail-band and thin tip, and at close range white specks on crown and forewings; brown below, more or less plain on throat and chest, finely white-banded on lower abdomen and thighs, and white-speckled on wing-linings; white central band on black tail and corresponding band running length of flight-feathers both narrower than on Crested Serpent-eagle [74] (pattern at base of primaries not certain). **Juvenile** No description.

**CONFUSION SPECIES** Adult unmistakable (but see Geographical Variation). Blyth's Hawk Eagle [242] also has black tail with white central band, but is otherwise all black above and black and white below, heavily barred on abdomen and wing-linings.

**VOICE** Not described.

**FOOD** No information.

**SOCIOSEXUAL BEHAVIOUR** No information.

**BREEDING** No information.

**POPULATION** With area of Simeulue of only 1,844 km<sup>2</sup>, three-figure population would be expected for representative of this generally common genus, but no data available.

**GEOGRAPHICAL VARIATION** Monotypic. Has affinities with peninsular Malaysian-north Sumatran race *malayensis* of Crested Serpent-eagle [74] and often treated (usually with some hesitation) as island race of that species. But clearly isolated from population of north mainland Sumatra: distinctly smaller, sex for sex, and sufficiently different in plumage detail (darker hindneck, richer purplish-brown upperparts, narrower tail-band, more barred underparts, and so on) to deserve recognition as separate species, particularly against the patterns of differences among *Spilornis* on other Indonesian islands. Among the serpent-eagles of the several islands and island groups extending 80-120 km offshore along some 850 km of the southwest-facing coast of Sumatra, those on the one most closely linked to the mainland (Batu, bridged by Pini) are indistinguishable from the populations of southern Sumatra itself (all *batu*), those on the next most closely linked (Simeulue, more distantly bridged by half-a-dozen small islands) are distinct enough, while those on the rest (intervening Nias, and the more southerly Mentawai group) are smaller still and respectively much paler and much darker. This Sumatran island series may be regarded as comparable to that in Andaman and Nicobar, and similar patterns of different-sized populations of often greatly differing colour saturation on adjacent islands is repeated elsewhere from Indonesia northwards, in the Java Sea north to the China Seas. There is usually little chance of their mixing, and it seems more realistic and more useful zoogeographically to treat them as distinct species.

**MEASUREMENTS** ♂ wing 330-345 mm, ♀ 343-362 mm; ♂ tail 204-213 mm, ♀ 214-227 mm. **Weights** No data.

**REFERENCES** Amadon (1964, 1974), Amadon & Bull (1988), Mitchell (1981), Richmond (1903), Ripley (1944), van Marle & Voous (1988).

**79 NIAS SERPENT-EAGLE**  
*Spilornis asturinus* AB Meyer, 1884

Plate 26

**DISTRIBUTION** Indomalayan (2°N to 1°N); order 3-?; possibly not uncommon, but range very limited. Indonesia: endemic to Nias, 95 km off southwest-facing coast of Sumatra. (See map p. 461.)

**MOVEMENTS** Presumed to be sedentary.

**HABITAT** Forested slopes. Island rises to maximum of 886 m.

**FIELD CHARACTERS** Very small, pale serpent-eagle with short bushy crest giving flat-crowned and big-headed look typical of *Spilornis*, bare yellow lores, relatively short tail and unfeathered legs. Perching behaviour perhaps comparable to Crested Serpent-eagle [74]; wing-tips may exceed central tail-band. Sexes similar, but female slightly larger; juvenile not described, but presumably distinguishable much as juvenile Crested.

**PERCHED Adult** One of palest, as well as smallest, of all serpent-eagles: mainly pale brown upperparts combine with prominent and extensive grey on head-sides to emphasise black crown and darker brown shoulders, both white-speckled, along with black of primaries and tail; pale brown below with slight grey wash and darker vermiculations down to breast, and typical white spotting on flanks, thighs and mid-belly, giving way to rather more uniform pale crissum; black tail has brownish-grey base, dull whitish central band and thin white tip. **Juvenile** No description. **Bare parts** Adult eyes, cere, lores and legs yellow.

**FLIGHT** Smallish-medium compact raptor with big head, broad round-tipped wings and, for this genus, relatively shortish tail; wingspan 2.2 times total length. No details of flight action, but perhaps comparable to Crested Serpent-eagle [74]. **Adult** Lightish brown above and below with contrasting black crown, dark tail with whitish central band and thin tip and, from underneath, corresponding band running length of flight-feathers, comparable to Crested Serpent-eagle (though under-pattern at base of primaries not certain); only at close ranges, white flecks on rear crown, forewings, wing-linings, flanks, thighs and belly, with paler crissum. **Juvenile** No description.

**CONFUSION SPECIES** Unmistakable within range, apart from unlikely possibility of vagrants from the neighbouring Batu group or mainland Sumatra of northern or southern Sumatran races of Crested Serpent-eagle [74] (both clearly larger and, as adults, darker without grey cheeks). Adult Blyth's Hawk Eagle [242], also with single white central tail-band, is larger still and much darker above, with pointed crest, fully feathered legs, white throat, streaked chest and otherwise strongly barred black on white abdomen and underwings; much browner juvenile is brown-banded buff below, with several tail-bands. Adult Wallace's Hawk Eagle [243] is closer in size and much browner, but differentiated by having two pale tail-bands as well as pointed crest, feathered legs, underwing pattern, etc.

**VOICE** Not described.

**FOOD** No information, but likely to be mainly snakes and lizards. Relatively longer wings, shorter tail and pale coloration may suggest that this is less of a strictly forest species than some of its congeners.

**SOCIOSEXUAL BEHAVIOUR** No information.

**BREEDING** No information.

**POPULATION** Nias is largest of island chain down western coast of Sumatra, with an area of 4,772 km<sup>2</sup>, so average of only 1 pair/98 km<sup>2</sup> would be necessary to produce three-figure population, but no data available.

**GEOGRAPHICAL VARIATION** Monotypic. Like other endemic serpent-eagles of various smaller islands of western Indonesia and north into the Andaman and China Seas, often treated (usually with some hesitation) as insular race of Crested [74]. This is among smallest and palest of whole genus, comparable in size (if relatively longer-winged and shorter-tailed) to that of the more southerly Mentawai group [80], but much smaller than the adjacent races of Crested Serpent-eagle, the southern Sumatran *batu* (which extends to the intervening Batu group only 80 km south of Nias) and the northern Sumatran *malayensis*. It is also considerably smaller, as well as far paler, than the Simeulue Serpent-eagle [78] from the next sizeable island off the west-facing Sumatran coast, 120 km to the north. Indeed, it is closest in appearance to the slightly larger and darker Natuna Serpent-eagle [81] of Belitung and Natuna more than 1,100 km to the east, on the opposite side of Sumatra and closer to Borneo. The populations of Simeulue, Nias, Mentawai, Belitung with Natuna and various other smaller islands are here all treated as distinct species (see [78] and pp. 73–74 for further discussion).

**MEASUREMENTS** ♂♀ wing 290–308 mm, tail 179–190 mm, tarsus 72 mm (one). **Weights** ♂ 420 g (one), ♀ 565 g (one).

**REFERENCES** Amadon (1964, 1974), Amadon & Bull (1988), MacKinnon & Phillipps (1993), Richmond (1903), Ripley (1944), van Marle & Voous (1988).

## 80 MENTAWAI SERPENT-EAGLE *Spilornis sipora* Chasen & Kloss, 1926

Plate 26

**DISTRIBUTION** Indomalayan (1°S to 3°S); order 5; possibly not uncommon, but range very restricted. Indonesia: endemic to Siberut, Sipora, Pagai Utara and Pagai Selatan, in Kepulauan Mentawai group, 85–120 km west of Sumatra. (See map p. 461.)

**MOVEMENTS** Presumed to be sedentary.

**HABITAT** Forest. These islands are below 450 m, and largely under 200 m.

**FIELD CHARACTERS** Small, dark serpent-eagle with short bushy crest giving flat-crowned and big-headed look typical of *Spilornis*, bare yellow lores, relatively short wings (perhaps indicating more essentially forest existence than congeners), and unfeathered legs. Perching behaviour perhaps comparable to Crested

Serpent-eagle [74]; wing-tips probably fall within or short of tail-band. Sexes similar, but female slightly larger; juvenile, though not described, possibly differs in similar way to juvenile Crested.

**PERCHED Adult** Predominantly dark chocolate-brown above and below, with blackish cheeks, so that black or blackish of crown, shoulders, primaries and tail hardly stand out; typical white spotting on rear crown, shoulders, flanks, thighs and mid-belly, giving way to dull barring on crissum; black tail has greyer base, whitish central band and thin tip. **Juvenile** No description. **Bare parts** Adult eyes, cere, lores and legs yellow. **FLIGHT** Compact buteo-sized raptor with big head, broad round-tipped wings, and medium-length tail; wingspan 2.1 times total length. No details of flight

action, but perhaps similar to Crested Serpent-eagle [74]. **Adult** Very dark, above and below, giving extra contrast to whitish central tail-band and corresponding band running length of flight-feathers, even though both are narrower than on Crested Serpent-eagle; underpattern at base of primaries not clear, only at close ranges, white flecks on rear crown, forewings, linings, flanks, thighs, belly and crissum (last more barred). **Juvenile** No description.

**CONFUSION SPECIES** Unmistakable within range, apart from unlikely possibility of vagrant, perhaps from neighbouring Batu, of south Sumatran race of Crested Serpent-eagle [74] (should appear larger and longer-winged, with adult noticeably paler, especially on cheeks and underparts). Adult Blyth's Hawk Eagle [242] also dark above with white central tail-band, but has pointed crest, fully feathered legs, white throat, streaked chest and otherwise strongly barred black on white abdomen and underwings; much browner juvenile is brown-barred buff below, with several tail-bands.

**VOICE** Not described.

**FOOD** No information but, as with congeners, probably mainly tree snakes and other reptiles.

**SOCIOSEXUAL BEHAVIOUR** No information.

**BREEDING** No information.

**POPULATION** The Mentawai islands total around 6,000 km<sup>2</sup> and so it seems reasonable to suppose population of well into three figures, but no data are available on numbers or even the extent of any deforestation on these once densely covered volcanic islands.

**GEOGRAPHICAL VARIATION** Monotypic. Like other endemic serpent-eagles of various lesser islands of western Indonesia and north into the Andaman, Javan and China Seas, often treated (usually with some hesitation) as insular race of Crested [74]. But distinctly smaller and darker than nearest race of that species, *bate* of southern Sumatra and adjacent Batu Island only 50 km to the north. Also very different from the other two taxa of islands still farther north off the southwest-facing coast of Sumatra, the Simeulue and Nias Serpent-eagles [78, 79]; here, these two and the Mentawai are all treated as distinct species (see [78] and pp. 73–74 for further discussion).

**MEASUREMENTS** ♂ wing 290–318 mm, tail 215 mm (one). **Weights** No data.

**REFERENCES** Amadon (1964, 1974), Amadon & Bull (1988), Chasen & Kloss (1926), MacKinnon & Phillipps (1993), Richmond (1903), Ripley (1944), van Marle & Vuoris (1988).

## 81 NATUNA SERPENT-EAGLE *Spilornis natunensis* Chasen, 1934

Plate 26

**DISTRIBUTION** Indomalayan (3.5°N to 3°S); order ♂; possibly not uncommon, but range very limited. Indonesia: endemic to Natuna Besar, north of west Borneo, and Belitung, between southwest Borneo and Sumatra, which are 700 km apart. Not found on Bangka, 100 km to west of Belitung, where serpent-eagle complex apparently unrepresented. (See map p. 46).)

**MOVEMENTS** Presumed to be sedentary.

**HABITAT** Wooded hills, perhaps also semi-open country. High peak on Belitung is just over 500 m, but much of island, including parts of central treeless plains, is less than 40 m above sea-level with clusters of hills here and there. The smaller volcanic Natuna Besar is highest in the north.

**FIELD CHARACTERS** Small, pale serpent-eagle with short bushy crest giving flat-crowned and big-headed look typical of *Spilornis*, bare yellow lores, relatively long wings and short tail, and unfeathered legs. Perching behaviour perhaps comparable to Crested Serpent-eagle [74]; wing-tips may exceed central tail-band. Sexes similar, but females slightly larger; juvenile not described, but may differ in same way as does juvenile Crested.

**PERCHED Adult** One of palest, as well as smallest, of all serpent-eagles; mainly pale brown upperparts combine with prominent and extensive grey on head-sides to emphasise black crown and darker brown shoulders, both white-speckled, along with black of primaries and tail; pale brown below with slight grey wash and darker vermiculations down to breast, and typical white spotting on flanks, thighs and mid-belly, giving way to rather

more uniform pale crissum; black tail has brownish-grey base, dull whitish central band and thin white tip. **Juvenile** No description. **Bare parts** Adult eyes, cere, lores and legs yellow.

**FLIGHT** Smallish-medium compact raptor with big head, broad round-tipped wings and, for this genus, relatively shortish tail; wingspan 2.2 times total length. No details of flight action, but perhaps comparable to Crested Serpent-eagle [74]. **Adult** Lightish brown above and below with contrasting black crown, dark tail with whitish central band and thin tip and, from underneath, corresponding band running length of flight-feathers, comparable to Crested Serpent-eagle (though underpattern at base of primaries not certain); only when close, grey cheeks, and white flecks on rear crown, forewings, wing-linings, flanks, thighs and belly, and paler crissum. **Juvenile** No description.

**CONFUSION SPECIES** Unmistakable within island ranges, apart from unlikely possibility of vagrants of various races of Crested Serpent-eagle [74] from western Borneo, peninsular Malaysia or southern Sumatra (all larger and, as adults, darker or much darker with different tones or patterns on cheeks, throat and underbody). On Belitung, adult Blyth's Hawk Eagle [242], also with single white central tail-band, is larger still and much darker above, with pointed crest, fully feathered legs, white throat, streaked chest and otherwise strongly barred black on white abdomen and underwings; much browner juvenile is brown-barred buff below, with several tail-bands.

**VOICE** Not described.

**FOOD** No information, but likely to be mainly snakes and lizards.

**SOCIOSEXUAL BEHAVIOUR** No information.

**BREEDING** No information.

**POPULATION** Belitung itself is just over 4,800 km<sup>2</sup>, while surrounding islets and the smaller Natuna Besar bring the grand total to something over 6,500 km<sup>2</sup>. A three-figure population seems the most likely.

**GEOGRAPHICAL VARIATION** Apparently monotypic, despite the 700 km gap between the two island populations, a degree of isolation which in other parts of the range of this complex superspecies is enough to have resulted in the evolution of marked differences in size and colour saturation. (In contrast, both these islands are only 200–250 km from Borneo, where the local lowland races, *pallidus* and *richmondi*, of the Crested Serpent-

eagle [74] are considerably larger, less strikingly pale, and solidly grey-throated.) Like other endemic serpent-eagles of various smaller islands of western Indonesia and north into the Andaman and China Seas, this bird often treated (usually with some hesitation) as insular race of Crested, but here regarded as distinct species (see [78] and pp. 73–74 for further discussion). The Natuna-Belitung birds are closest in size, shape and general appearance to the even smaller taxon on Nias [79], more than 1,100 km away off the southwest-facing coast of Sumatra.

**MEASUREMENTS** ♂ wing 295–309 mm, ♀ 313–324 mm. **Weights** No data.

**REFERENCES** Amadon (1964, 1974), Amadon & Bull (1988), Chasen (1937), Holmes & Nash (1990), MacKinnon & Phillipps (1993), Mees (1986), van Marle & Voous (1988).

## 82 KINABALU SERPENT-EAGLE

*Spilornis kinabaluensis* WL Sclater, 1919

Plate 26

Other name: Mountain Serpent-eagle

**DISTRIBUTION** Indomalayan (6°N to 4°N); order 3?; restricted range and generally regarded as rare, but poorly known. Insular Malaysia and Indonesia: endemic to higher mountain ranges of Sabah and adjacent parts of Sarawak and Kalimantan, north Borneo, from Gunung Kinabalu and Gunung Trus Madi to Gunung Mulu and Gunung Murud, probably including Crocker, Witi and Maitland Ranges. (See map p. 461.)

**MOVEMENTS** Presumed to be sedentary.

**HABITAT** Montane forest, probably mostly between 1,500 m and 2,500 m, but occasionally occurs as low as 1,000 m on Kinabalu, whose peak is nearly 4,100 m.

**FIELD CHARACTERS** Medium-sized and particularly dark-looking serpent-eagle with short bushy crest giving flat-crowned and big-headed look typical of *Spilornis*, bare yellow lores, medium-length wings and tail, and unfeathered legs. Perching behaviour perhaps comparable to Crested Serpent-eagle [74]; wing-tips probably just exceed tail-band. Sexes similar, but female slightly larger; juvenile probably distinct, but no description available.

**PERCHED Adult** Very dark brown above, with white-tipped black primaries, white-spangled blackish shoulders, and white-flecked black crown barely standing out from otherwise mainly blackish head; but colour of plain reddish-brown breast extends back on tips of black nape-feathers to form rich brown bars that combine into fairly wide band across back of head; below, apart from blackish cheeks and throat, and reddish-brown breast, all dark brown with slight rufous tinge and fine white spotting on flanks, thighs, belly and crissum; tail black with thin whitish tip, and relatively broad central band that is much whiter above than on many serpent-eagles.

**Juvenile** No description. **Bare parts** Adult eyes, cere, lores and legs yellow.

**FLIGHT** Mid-sized raptor with big head, broad round-tipped wings, and medium-length tail; wingspan 2.2

times total length. No details of flight action, but perhaps comparable to Crested Serpent-eagle [74]. **Adult** All dark above, apart from quite broad whitish central tail-band and thin tip, and at close range rusty collar, white specks on crown and forewings; below, blackish throat stands out from plain reddish-brown breast; otherwise mainly dark wing-linings and abdomen with rufous tinge and fine white spots; white central band on black tail and corresponding band running length of flight-feathers both relatively broad, and second narrower band across bases of primaries. **Juvenile** No description.

**CONFUSION SPECIES** Needs to be distinguished from north Bornean lowland race, *pallidus*, of Crested Serpent-eagle [74] (smaller, relatively shorter-winged, adult obviously paler with clear-cut black crown and nape, pale greyish cheeks and throat, larger and black-edged white spots on abdomen, duller brownish-white band on uppertail, probably two thin white bars on bases of undersides of primaries). Blyth's Hawk Eagle [242] also has black tail with white central band, but is otherwise all black above with longer plain crest, and black and white below, heavily barred on abdomen and wing-linings, with black median stripe on white throat. (See also [76].)

**VOICE** 'Similar to Crested Serpent-eagle [74] but distinctive' (MacKinnon & Phillipps) and 'vocalizations quite different' (HBW).

**FOOD** No information, but likely to be mainly snakes and lizards.

**SOCIOSEXUAL BEHAVIOUR** No information.

**BREEDING** No information.

**POPULATION** Most records have come from Kinabalu, Mulu and Murud, three peaks lying at the corners of a mountainous triangle of sides 260 km and base 75 km, but this species is very poorly known and doubtless also occurs in some intervening montane forests. The

triangle would have an area of over 9,000 km<sup>2</sup> and the total may be greater still if the Witt and Maitland Ranges, just to the east, are indeed also involved. On that basis, a density of no more than 1 pair/180–200 km<sup>2</sup> would be necessary to give a three-figure adult population. Mountain-forest clearance on an island where there has been much serious felling and burning in recent years must be a longer-term threat.

**GEOGRAPHICAL VARIATION** Monotypic. Has in past tended to be treated as yet another race of Crested Serpent-eagle [74], but is quite different from the two Bornean forms of that species, *pallidus* and *richmondi*, being larger and relatively longer-winged as well as much darker, with distinctive blackish throat and cheeks, reddish-brown nape-band, rufous breast and finely spotted brown abdomen. These are also both lowland

populations and there is no evidence of intergradation between the north Bornean *pallidus* and the present species, which is generally found at higher altitudes. In its black throat and face, dark brown upperparts and rufous chest, it is perhaps closest to the Sulawesi Serpent-eagle [84] (though differing in various other ways) and may represent a second-wave colonisation of Borneo from Sulawesi subsequently restricted by competition to montane forests (see [78] and p. 73–74 for further discussion).

**MEASUREMENTS** ♂ wing 370–390 mm. **Weights** No data.

**REFERENCES** Amadon (1964, 1974), Amadon & Bull (1988), Collar & Andrew (1988), MacKinnon & Phillipps (1993), Smythies (1981).

## 83 BAWEAN SERPENT-EAGLE

### *Spilornis baweanus* Oberholser, 1917

Plate 26

**DISTRIBUTION** Indomalayan (6°S); order 2?; probably scarce to rare in very limited range. Indonesia: endemic to Bawean Island, 110 km north of Java and Madura. (See map p. 461.)

**MOVEMENTS** Presumed to be sedentary.

**HABITAT** Forested slopes. Island rises to maximum of 886 m.

**FIELD CHARACTERS** Small and fairly dark serpent-eagle with short bushy crest giving flat-crowned and big-headed look typical of *Spilornis*, bare yellow lores, relatively short wings, medium-length tail, and unfeathered legs. Perching behaviour perhaps comparable to Crested Serpent-eagle [74]; wing-tips probably do not exceed tail-band. Sexes similar, but female slightly bigger; juvenile distinct.

**PERCHED Adult** Dark brown above, with white-tipped black primaries, white-spangled blackish shoulders, and white-flecked black crown not standing out strongly from dusky cheeks and slightly paler upper mantle; throat, lower neck-sides and chest plain rich brown, becoming slightly spotted on lower breast and distinctly barred with white (not dark-edged) on lower flanks, thighs and belly to crissum; tail mainly black with thin whitish tip, relatively narrow central whitish band and brown band at base. **Juvenile** No detail available, but broadly like other young *Spilornis*, with dark-streaked white to buff head and underparts, black mask and blotched back and coverts. **Bare parts** Adult eyes, cere, lores and legs yellow; juvenile cere may be greener.

**FLIGHT** Smallish-medium raptor with big head, shortish and broad round-tipped wings, and medium-length tail; wingspan 2.0 times total length. No details of flight action, but perhaps comparable to Crested Serpent-eagle [74]. **Adult** Dark above, apart from relatively narrow whitish central band and thin tip on mainly black tail, and at close range brown tail-base, white specks on crown and forewings; below, rich brown (not dark brown) body and wing-linings, plain on throat and chest, speckled whitish on lower breast and linings, and clearly barred on abdomen to crissum; white central band on

tail and corresponding band along flight-feathers both relatively narrow but still conspicuous; white area at bases of primaries crossed by three dark bands. **Juvenile** All whitish to buff below with lightly streaked body, thinly barred flight-feathers and boldly banded tail (at least two pale and three dark bands visible).

**CONFUSION SPECIES** This is the sole raptor known on Bawean. Other species may occur on migration, but none that is likely to be confused.

**VOICE** No information.

**FOOD** No information, but likely to include snakes and lizards.

**SOCIOSEXUAL BEHAVIOUR** No information.

**BREEDING** No information.

**POPULATION** Bawean is a small island only 190 km<sup>2</sup> in area, and so it seems most unlikely to be able to provide for more than two-figure population. (Fifty pairs, without allowing for non-breeders, would require density of only 1 pair/3.8 km<sup>2</sup>.) No data on current state of habitats, human population, or threats to birds.

**GEOGRAPHICAL VARIATION** Monotypic. Has tended to be treated as race of Crested Serpent-eagle [74], but is quite different from nearest forms of that species, being much smaller and significantly less dark, with barred (not spotted) abdomen and thighs, than *S. cheela bido* of Java (110 km to south), and at the same time slightly smaller and much darker, with different barring on primaries, than *S. c. richmondi* of southern Borneo (250 km to north) (see [78] and p. 73–74 for further discussion).

**MEASUREMENTS** ♂ wing 310–324 mm, tail 208–231 mm, tarsus 72–77 mm. **Weights** No data.

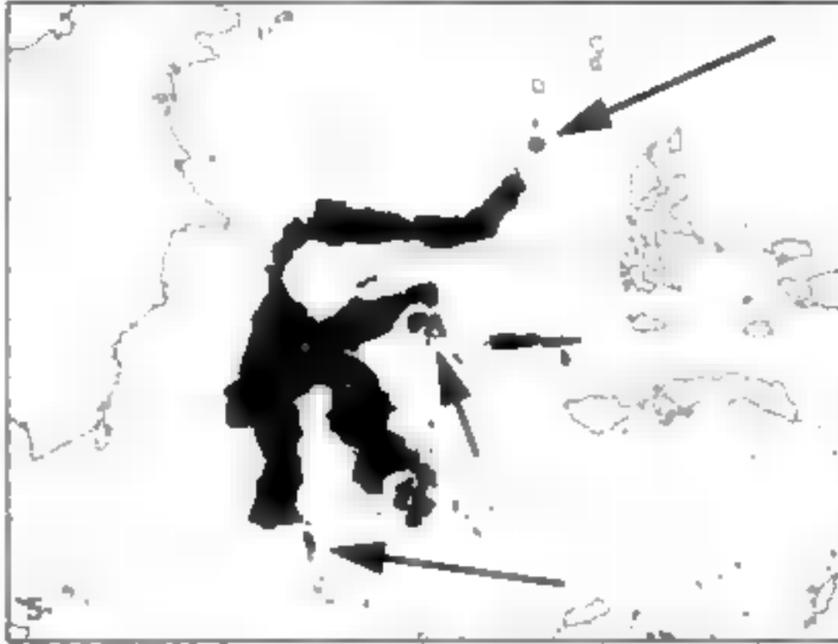
**REFERENCES** Amadon (1964, 1974), Amadon & Bull (1988), Hoogerwerf (1962, 1966, 1967), MacKinnon & Phillipps (1993), Oberholser (1917).

**84 SULAWESI SERPENT-EAGLE**  
*Spilornis rufipectus* Gould, 1858

Plate 27

Other name: Celebes Serpent-eagle

**DISTRIBUTION** Indomalayan (3°N to 6°S); order 5; widespread and locally common in restricted island range. Indonesia: endemic to Sulawesi (formerly Celebes) and associated islands, including at least three off the northern promontory (Siau, Talisei, Lembih) and three to the south (Salayar, Muna, Buton), as well as Togian and eastward through Peleng and Banggai to the main islands of the Sula archipelago (Taliabu, Mangole, Sulabesi).



**MOVEMENTS** Presumed to be sedentary, but several islands contiguous and immatures could easily wander.

**HABITAT** Various primary forest, secondary growth, savannah, and ricefields near villages: 'occurs most readily in a not too densely populated landscape, where open water and forest alternate in a mosaic' (Meyburg & van Balen). Sea-level to 1,000+ m, mainly 250 m to 850 m.

**FIELD CHARACTERS** Smallish dark serpent-eagle with short bushy crest that gives flat-crowned and big-headed look typical of genus, bare yellow lores, moderately long wings, medium-length tail and unfeathered legs. Perching behaviour perhaps similar to that of Crested Serpent-eagle [74]; wing-tips reach distal tail-bar. Sexes similar, but female averages 5% larger (up to 15%); juvenile quite different.

**PERCHED Adult** Rear crown and nape edged rufous-buff, but no white showing unless crest raised and so, with dark grey cheeks and blackish throat, whole head looks black, sharply demarcated from rich rufous-brown chest (almost plain but for faint shaft-streaks); rest of upperparts dark chocolate-brown with some rufous-buff edges on hindneck, mantle and scapulars (but no white spangling on wing-coverts); blacker tail has whitish tip, broad brownish-white band towards distal half and second, much more obscure, nearer base (both greyish-white underneath); lower abdomen, flanks, thighs and crissum darker brown than rufous chest, but all spotted and barred with white. **Juvenile** Crown, bushy nape, and rear cheeks creamy, spotted by neat black feather-centres, apart from bold black patches behind eyes; mantle and back creamy to buff, looking rather more blotched by dark brown feather-centres; mid-wings also show mixture of brown with paler feather-edges and

whitish bases, between dark brown shoulders and secondaries and blacker primaries; dark brown tail has greyish-white tip and three paler brownish-grey bands; all buffish-white to white below, plain on throat, boldly spotted dark brown on breast, and more obscurely streaked rufous on belly, thighs and crissum. **Bare parts** Adult eyes bright yellow, juvenile grey, becoming yellow. Adult cere and lores bright yellow, juvenile greenish-yellow. Legs dull yellow.

**FLIGHT** Buteo-sized raptor with big head, medium-length tail and broad round-tipped wings; wingspan 2.3 times total length. No details of flight action, but perhaps similar to Crested Serpent-eagle [74]. **Adult** Looks all dark above with black head (rufous-buff edges from crest to mantle being visible only at close range), apart from pale tip and brownish band on tail, with basal second band much less obvious; below, sharply demarcated black head, plain rufous-brown chest, white-spotted brown lower breast and wing-linings (lesser and median coverts only), and more barred abdomen; mainly black or blackish greater coverts and flight-feathers with single broad greyish-white band running whole length of wings, and two narrower bands across bases of primaries; comparably patterned black tail with broad whitish band and narrower second partly hidden by coverts. **Juvenile** Dark-speckled creamy head with bold black patches behind eyes, and blotchy mantle and wing-diagonals across median coverts; otherwise dark brown above apart from thin pale tip and three brownish-grey to pale brown bands on tail (distal most obvious); mainly creamy-white below, with plain throat, rather sparse band of thick dark spots across breast, pale rufous-streaked lower abdomen, more strongly rufous-mottled wing-linings emphasised by diagonal of blackish spots along greater and primary coverts, and thinly dark-barred and dark-tipped flight-feathers, while tail looks predominantly grey with relatively narrow dark sub-terminal band and three dark bars.

**CONFUSION SPECIES** Black bushy head, yellow lores, rufous breast, white-barred abdomen and, in flight, striking wing and tail patterns all make adult unmistakable. Despite having less bold tail pattern than some other immature serpent-eagles, even juvenile could hardly be confused with any other Sulawesi species on account of its yellow lores, black ear-patches, rufous wing-linings, and so on. Most similar in flight from below might be immature stages of generally but not always larger Sulawesi Hawk Eagle [240], which in second-third year acquires incomplete streaks and bars in place of juvenile's all-white head, underbody and wing-linings, but still remains pale with white-based primaries and no rufous on wing-linings (see also under that species). All hawk eagles also have fully feathered legs. Juvenile Rufous-bellied Hawk Eagle [233] has (different) black mask, but again is far whiter below with translucent inner primaries and multi-barred tail.

**VOICE** *Pi-wi-krek*; also *krek* or *kok* repeated.

**FOOD** Little known: records include lizards, small grass snakes, occasional rodents. Variety of prey and hunting

methods perhaps similar to those of Crested Serpent-eagle [74], but often seen in and over open grassland, and attracted to grass fires.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, often, in pairs. Single or mutual high-circling accompanied by much calling, but no other data on aerial displays.

**BREEDING** Little information, but season probably January–April; fledged young recorded in May.

**POPULATION** Land area of mainland Sulawesi is 189,000 km<sup>2</sup> and, with the associated smaller islands, total range must be some 0.2 million km<sup>2</sup>. Thus, density of 1 pair/40 km<sup>2</sup> would be necessary to produce 10,000 breeding adults. Until mid 1980s this was regarded as a threatened species, but now found to be common in half-dozen areas studied over last decade: total of 27 seen in linear 2,500 km journey across Sulawesi made this the second commonest raptor recorded; and, in Sula group, 'frequently encountered on Taliabu'. On the above basis, and allowing for non-breeders and immatures, a five-figure population seems likely. Sulawesi is still largely forested, though cultivation and logging have claimed considerable areas in the south and north-eastern peninsulas, and this species appears to show

considerable ecological adaptability. In the longer term, however, deforestation and disturbance must pose threats.

**GEOGRAPHICAL VARIATION** Two races usually recognised, though the differences appear clinal, with the population of Peleng and Banggai somewhat intermediate.

*S. r. rufipectus* (Sulawesi and most satellite islands) Averages larger; considerably darker, head blacker, lower breast and belly rather more narrowly spotted and barred.

*S. r. sulaensis* (Sula group, ?Peleng and Banggai) Averages larger; much paler, cheeks and throat blackish-grey, lower breast and belly more clearly and broadly barred.

**MEASUREMENTS** *S. r. rufipectus* ♂ wing 322–345 mm, ♀ 328–370 mm; ♂♀ tail 218–250 mm, tarsus 69–76 mm. *S. r. sulaensis* ♂ wing 309 mm, ♀ 325–345 mm. **Weights** No data.

**REFERENCES** Amadon (1964, 1974), Bishop *et al.* (1994), Brown (1976b), Butler (1899), Collar & Andrew (1988), Coomans de Ruiter (1947), Mesburg & van Balen (1994), Rosendaal & Dekker (1989), Stresemann (1940a), van Balen (1994), van Bemmelen & Voous (1951), Watling (1985), White & Bruce (1986).

## 85 PHILIPPINE SERPENT-EAGLE *Spilornis holospilus* (Vigors, 1831)

Plate 27

**DISTRIBUTION** Indomalayan (18.5°N to 6°N); order 4–5; widespread and not uncommon in limited island range. Philippines: endemic to all main islands from Luzon to Mindanao (but not Calamian group, Palawan, or Sulu Archipelago).



**MOVEMENTS** Presumed to be sedentary, but several islands contiguous and immatures could easily wander.

**HABITAT** Riverine forest, forest edge, wooded foothills, open country with cultivation and scattered trees. Sea-level to 2,500 m, mainly below 1,500 m.

**FIELD CHARACTERS** Smallish and fairly pale serpent-eagle with short bushy crest that gives flat-crowned look typical of genus, bare yellow lores, unfeathered legs, and relatively shorter wings and longer tail than some congeners. Perching behaviour perhaps similar to that

of Crested Serpent-eagle [74]; wing-tips probably do not exceed tail-band. Sexes similar, but female averages 6% larger (up to 16%) and possibly much heavier; juvenile quite different.

**PERCHED Adult** Mainly pale dull brown above, thinly white-spotted on wing-coverts, so that black crown, rufous-edged black nape, and grey to grey-brown cheeks and throat make head stand out as darker; also contrasting blacker primaries and tail, latter with whitish tip, broad pale brown central band and traces of second narrower basal band (both white to grey underneath); below, all rufous from chest to tail-coverts with bold brown-edged white spots, merging into bars only on crissum. **Juvenile** Creamy-white crown and bushy nape to upper mantle more sparsely streaked and spotted with dark brown than on most other juvenile *Spilornis*, and dark patches behind eyes less solidly black (so looking whiter-headed); otherwise brown above with rufous and buff edges, and white bases showing through on mid-wing coverts; dark brown tail has pale tip and three light brownish bands (more greyish-white below); underparts all cream to white, plain on throat, boldly streaked rufous on breast, and paler rufous on belly, thighs and crissum. **Bare parts** Adult eyes yellow, juvenile grey, turning yellow. Adult cere and lores bright yellow, juvenile blue-grey (?). Legs dull yellow.

**FLIGHT** Buteo-sized raptor with big head, broad round-tipped wings, and longer tail than congeners; wingspan 2.1 times total length. No details of flight action, but perhaps similar to Crested Serpent-eagle [74]. **Adult** Brown above with blackish head (rufous-buff edges from crest to upper mantle visible only at close range), and blackish-brown wing-tips and tail, latter with light tip.

broad pale brown central band and narrower basal band (half-hidden by white-spotted rufous uppertail-coverts); below, greyish cheeks and throat look darker than white-spotted rufous underbody and wing-linings; blackish-brown flight-feathers and tail have bold whitish central band right across, thinner second whitish band across bases of primaries, and traces of second band at bases of secondaries and tail (latter partly hidden by coverts).

**Juvenile** Thinly brown-streaked creamy-white head with dusky patches behind eyes obviously paler than rest of upperparts, which are fairly dark brown with rufous-buff edges and some white bases giving blotchy look to mantle and diagonals across median coverts, while tail has thin buff tip and three pale brown bands (basal partly hidden by coverts); mainly creamy-white below, with plain throat, rufous streaks on wing-linings and rest of underbody (strongest across breast), and thinly dark-banded and dark-tipped flight-feathers, while tail looks predominantly grey with three dark bars.

**CONFUSION SPECIES** Adult, with darkish head, bare yellow lores, white-spotted rufous underparts and, in flight, bold wing and tail patterns, hardly likely to be mistaken for anything else (though a vagrant of the Palawan race of Crested Serpent-eagle [74] might conceivably wander across the Mindoro Strait: see Geographical Variation). Juvenile apparently lacks yellow cere and lores of most other young serpent-eagles, but could be confused only with immatures of Changeable Hawk Eagle [257], Philippine Hawk Eagle [241] and Rufous-bellied Hawk Eagle [253] (adults of all are well streaked with black below, while juveniles much more uniformly white): all have different head shape (two with short pointed crest), feathered lores and legs, and whiter-based and more translucent inner primaries, as well as normally soaring on flatter wings (just slightly raised in case of Philippine Hawk Eagle).

**VOICE** Series of short far-ringing whistles, followed by *pherruu-pherruu*, sometimes the latter alone (B&A).

**FOOD** Prey and hunting methods perhaps comparable to those of congeners (see Crested Serpent-eagle [74], etc).

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. High-circling accompanied by calling, but no other details of aerial displays.

**BREEDING** No information, apart from female with egg in oviduct in April.

**POPULATION** With land area of islands involved approaching 300,000 km<sup>2</sup>, average of only 1 pair/60 km<sup>2</sup> would be necessary to produce 10,000 breeding adults. Whether such a figure is reached in the densely populated and increasingly deforested Philippines is perhaps questionable, though *Spilornis* serpent-eagles are more adaptable than most forest raptors to man-made habitats of open country and cultivation.

**GEOGRAPHICAL VARIATION** Monotypic. Long 'customary' to treat this as a distinct species, but recently there has been a tendency to regard it as a race of Crested Serpent-eagle [74], as is *palawanensis*, the taxon of the adjacent Palawan chain from the Calamians to Balabac. But latter, despite its proximity (as little as 80 km), appears to be constantly larger, relatively shorter-tailed, and to have pattern of head, chest and undersides of quills much closer to the lowland Bornean races, which are again smaller.

**MEASUREMENTS** ♂ wing 317–341 mm, ♀ 332–367 mm; ♂♀ tail 230–263 mm, tarsus 77–94 mm. **Weights** ♂ 603–672 g, ♀ 691 g–1.6 kg.

**REFERENCES** Amadon (1964, 1974), Amadon & Bull (1988), Brown (1976), Butler (1899), Dickinson *et al.* (1991), Gilliard (1950), McGregor (1909–10), Rand & Rabor (1960).

## 86 RYUKYU SERPENT-EAGLE *Spilornis perplexus* Swann, 1922

Plate 26

Other name: Ryukyu Crested Serpent-eagle

**DISTRIBUTION** Indomalayan (24.5°N to 24.25°N); order 2+; not uncommon over very limited range on two islands. Southernmost of Japanese Nansei-shoto (formerly Ryukyu Islands), east of Taiwan: endemic to Iriomote-shima (quite common) and Ishigaki-shima (uncommon and local). (See map p. 461.)

**MOVEMENTS** Believed sedentary, but vagrant recorded on Yonaguni-shima, c65 km farther west (see Geographical Variation).

**HABITAT** Subtropical evergreen forest on low hills, also occurring around coastal cultivation, particularly in winter. Sea-level to c500 m.

**FIELD CHARACTERS** Smallish and very pale serpent-eagle with short bushy crest (giving flat-crowned look), bare yellow lores, medium-length wings and tail, and unfeathered legs, much as congeners. Perching behaviour perhaps comparable to that of Crested Serpent-eagle [74]; wing-tips just exceed light tail-band. Sexes

similar, but female averages 4% larger (up to 10%) and possibly much heavier; juvenile quite different.

**PERCHED Adult** Mainly pale brown above, thinly white-spotted on darker shoulders and white-edged on larger wing-coverts, so that black crown, edged with white (not rufous), white-tipped blackish primaries, and mainly black tail (with whitish tip and central band) all stand out as much darker; cheeks and whole underbody also pale brown but tinged rufous, finely vermiculated with slightly darker brown on lower throat and breast, and spotted with white on flanks, belly and crissum. **Juvenile** Not described in detail, but very white-looking on head, crest, mantle and underparts, variously speckled and streaked darker, and with dusky patches behind eyes, producing pattern corresponding to other light-coloured juvenile *Spilornis* serpent-eagles, if paler than most; dark brown tail with lighter brownish bands (more greyish-white below). **Bare parts** Adult eyes, cere, lores and legs all yellow; juvenile undescribed, but likely to be similar, if duller, except eyes probably brown or grey at first.

**FLIGHT** Compact buteo-sized raptor with biggish head, short broad wings with very round-tips, and medium-length tail; wingspan 2.2 times total length. Soars with wings in distinct V; flight action in general perhaps comparable to Crested Serpent-eagle [74]. **Adult** White-flecked black crown and nape, and whitish-tipped black tail with broad grey-white central band contrast with pale brown cheeks, mantle and back; slightly darker wings have blackish subterminal band and tips, and thin whitish trailing edge, also white-spotted blacker shoulders; below, whole underbody and wing-linings pale rufous-brown, all finely white-speckled except on throat and faintly darker-banded breast; flight-feathers and tail black, each with unmistakable pattern of broad central band and whitish trailing edge (any subsidiary white barring not described). **Juvenile** Little detail (see 'Perched'), but looks much whiter than adult, notably on head and underparts; mainly brown above otherwise, with obscurely banded tail; and generally pale below, variously streaked on body and wing-linings, and only rather faintly barred on flight-feathers, but darker wing-tips and contrasting dark brown tail with whitish tip and bands.

**CONFUSION SPECIES** Unmistakable at all ages with combination of flat bushy head, bare yellow lores, and flight shape, tail pattern and (adult) wing pattern. This is the accipitriform of southern Nansen-shoto: only other remotely rounded-winged raptors of comparable size that occur – or, in most cases, only might occur as vagrants – are Eastern Honey-buzzard [19], Northern Marsh Harrier [100], Northern Goshawk [153], Grey-faced Buzzard [162], Common Buzzard [203] and Rough-legged Buzzard [209].

**VOICE** Not described.

**FOOD** Snakes, frogs and other small prey. Hunting methods perhaps comparable to those of congeners (see Crested Serpent-eagle [74]).

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs or family parties. No details of aerial displays.

**BREEDING** No data. Although long assumed, breeding was not even proved until 1981.

**POPULATION** The land area of the two islands concerned is little more than 200 km<sup>2</sup>, but surveys in 1980s showed 60 adults, 13 juveniles and four unaged on Iriomote-shima, and 7–12 adults and 3–4 juveniles on Ishigaki-shima, indicating a high minimum density of c1 pair/6 km<sup>2</sup> and a total population then of just under 100. Japanese 'National Monument' and 'Special Bird for Protection'.

**GEOGRAPHICAL VARIATION** Monotypic. Usually treated as race of Crested Serpent-eagle [74], but quite different in colour and, notably, size from the adjacent Taiwan taxon, *hoya*, which is much larger (shortest wings nearly 10 cm, or over 25% longer than longest *perplexus*) and far darker all over, including blackish cheeks to throat and almost uniform breast. Indeed, *hoya* provides fair case for specific treatment, too, being very different from nearby mainland form, *ricketti*, which is again pale (though not so light-coloured as *perplexus* and also much larger). The closest other serpent-eagle taxon to *perplexus* is the Philippine *holospilus* [85], more than 600 km to the south, and that represents another direction of evolutionary development. In short, although clearly part of same superspecies, *perplexus* differs to significant extent from its neighbours after evident long isolation [see also discussion under 76 and 78]. Was the vagrant on Yonaguni-shima, c65 km west of Iriomote-shima but only c120 km east of Taiwan (see Movements), certainly *perplexus* and not *hoya*?

**MEASUREMENTS** ♂ wing 338–360 mm, ♀ 354–372 mm; ♂ tail 215–221 mm, ♀ 227–237 mm; ♂♀ tarsus 70–79 mm. **Weights** No data.

**REFERENCES** Amadon (1964, 1974), Amadon & Bull (1988), Brazil (1991), Hanawa *et al.* (1985), Miyazaki (1981).

## 87 WEST AFRICAN SERPENT-EAGLE *Dryotriorchis spectabilis* (Schlegel, 1863)

Plate 25

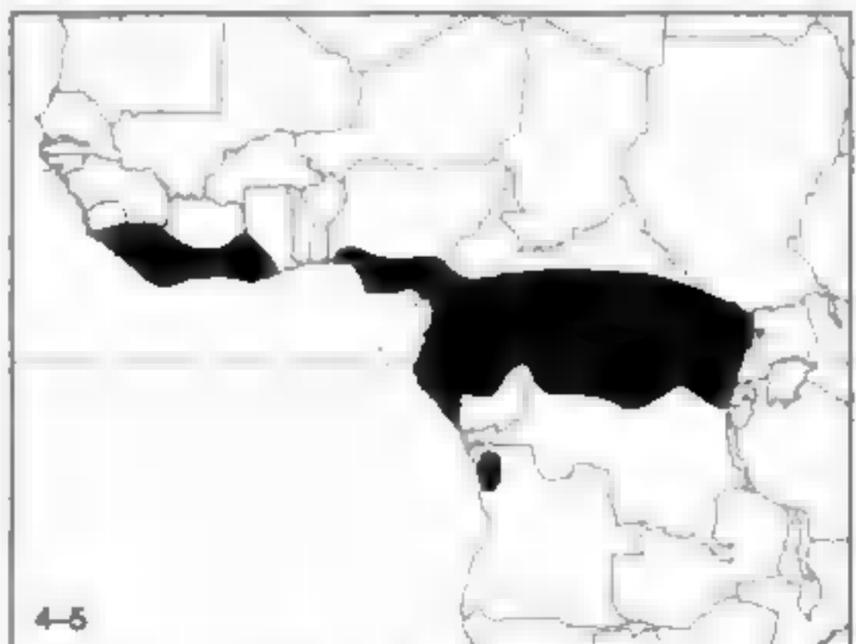
Other name: Congo Serpent-eagle

**DISTRIBUTION** Afrotropical (9°N to 9°S); order 4–5; uncommon and inevitably reduced by deforestation, but probably under-recorded. West and Central Africa: southern Sierra Leone and Guinea, Liberia and southern parts of Ivory Coast, Ghana, Nigeria and Central African Republic south into northern and eastern DR Congo and, farther west, through Gabon and PR Congo to north Angola.

**MOVEMENTS** Likely to be sedentary, or at most locally nomadic, but little known.

**HABITAT** Dense lowland primary forest, where it lives within the dark understorey. Sea-level to 900 m.

**FIELD CHARACTERS** Smallish and atypical snake-eagle, being adapted to forest existence and somewhat accipiter-like; as adult dark above and paler with variable spots/bars below, with short deep bill, large yellow or



dark eyes, relatively small head with short crest, and longish tail. Stays within canopy, probably perching rather upright; wing-tips barely exceed base of tail.

Decreasing colour saturation from west to east. Sexes similar, and female averages under 3% larger; juvenile distinct.

**PERCHED Adult** Dark brown above, with blackish crown and dark rufous collar, but generally paler in east; black moustaches and median throat-stripe; white below, variably washed rufous, particularly in west where heavily marked with round blackish blobs, more barred on flanks and thighs; in east, spots and bars only on flanks and thighs. **Juvenile** Head and upper mantle white, variably spotted with rufous and black; no moustaches or throat-stripe; otherwise shades of brown above, edged whitish, and more or less white below, variably (but, compared with western adults, relatively lightly) spotted with black and rufous. (No details of moults or immature stages.) **Bare parts** Adult male eyes yellow, female dark grey-brown, juvenile browner. Cere and feet yellow.

**FLIGHT** Mid-sized raptor with short, broad, rounded-tipped wings, long graduated tail, less prominent head than other snake-eagles; wingspan 1.8 times total length. No description of flight action, but likely to be mixture of shallow beats and glides, mostly for short distances. **Adult** More or less dark brown above, apart from rufous collar, thinly whitish-fringed rump, and obscurely barred tail with thin black subterminal band and whitish tip; below, white variously tinged rufous, and spotted and barred with black, wing-linings corresponding to body in tone and pattern, and flight-feathers and tail clearly barred; black moustaches and throat-stripe. **Juvenile** Readily distinguished by pale head and patterned coverts; differs from very variable adults below in spotted (not barred) flanks and less clearly banded secondaries and tail.

**CONFUSION SPECIES** Shares much of range with two other rare West and Central African endemic raptors with short wings: Cassin's Hawk Eagle [236] is larger, more thickset and relatively small-headed with, in particular, a shorter tail and feathered legs; and Long-tailed Hawk [158] is clearly smaller but for its far longer, graduated and white-tipped tail that accounts for nearly half its total length. In both cases, adults distinctive enough on plumage, too, but their juveniles are basically brown above and, below, whitish variably marked with blackish spots and bars; but pale head of juvenile serpent-eagle should be obvious, apart from very different structural features. African accipiters are all much smaller, except Great Sparrowhawk [151], which is clearly black or black and white as adult (without rufous collar or black moustaches) and streaky brown, or rufous below as juvenile.

**VOICE** Mournful nasal *cow cow cow...* in prolonged

series. Reported cat-like miaowing may be equivalent of *ko-waaa* note of other snake-eagles.

**FOOD** Known only from stomach contents of birds collected: snakes, chameleons and other lizards, amphibians; possibly some small mammals, though those recorded may have been ingested inside snakes. Forages mostly within understorey of forest (large eyes well adapted to such habitat). Likely to still-hunt from series of tree perches, snatching prey from foliage or dropping to ground; at times may repeatedly strike at ground prey with feet, almost in manner of Secretarybird [249].

**SOCIOSEXUAL BEHAVIOUR** Generally solitary or in pairs. No information on any aerial or other displays.

**BREEDING** No information, apart from indications of breeding in October–December in Gabon and during June–November in DR Congo.

**POPULATION** Although little known – because it is difficult to see in its dense habitat – the frequency with which it can be heard suggests that it is may be quite common, at least locally. As it is essentially a forest bird, with seemingly little ability to adapt to thinner secondary growth or plantations, it has greatly decreased in West Africa, especially in the Upper Guinea zone where there has been such extensive forest destruction. It is still found in ten to eleven countries, however, including much of the upper two-thirds of the vast DR Congo and, so far as is known, its range still extends over the best part of 2 million km<sup>2</sup>. Thus, it would take only an average of 1 pair/200 km<sup>2</sup> to reach a five-figure population, without even allowing for immatures and other non-breeders. Yet it is clearly vulnerable to continuing deforestation, particularly in West Africa.

**GEOGRAPHICAL VARIATION** Two races.

*D. s. spectabilis* (Sierra Leone to north Cameroon) Blacker, more rufous and heavily spotted below.

*D. s. batesi* (south Cameroon and Central African Republic south into DR Congo, PR Congo, Gabon and north Angola) Paler, and largely white below.

**MEASUREMENTS** *D. s. spectabilis* ♂ wing 367–397 mm, tail 245–268 mm, tarsus 63–70 mm. *D. s. batesi* ♂ wing 282–307 mm, ♀ 300–307 mm. **Weights** No data.

**REFERENCES** Brown *et al.* (1982), Brosset & Erard (1986), Chapin (1932), Gatter (1988), Grimes (1987), Kemp & Kemp (1998), Lippens & Wille (1976), Louette (1981), Mackworth-Praed & Grant (1957–73), Pinto (1983), Rodewald *et al.* (1994), Serle *et al.* (1977), Snow (1978), Thiollay (1975a, 1978c).

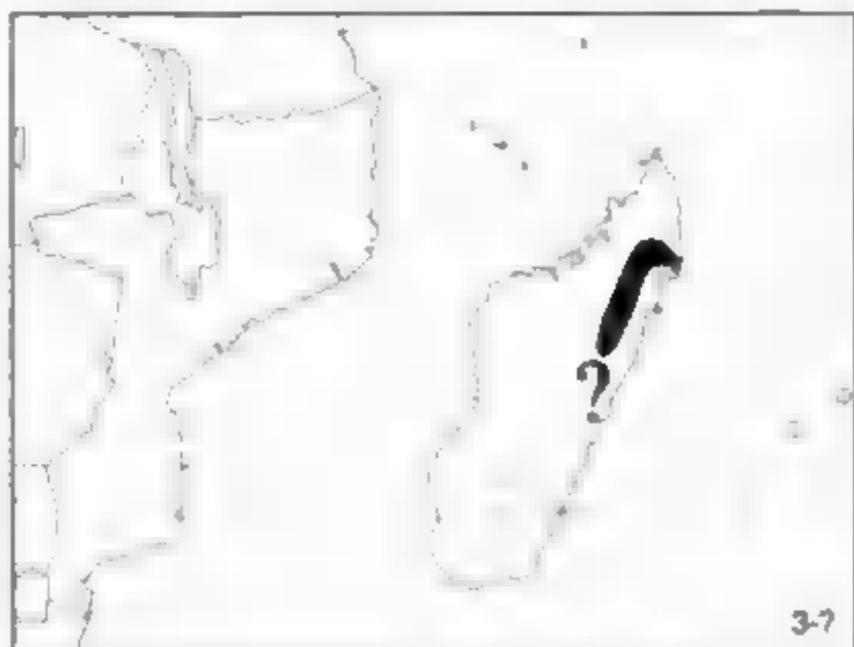
## 88 MADAGASCAR SERPENT-EAGLE *Eutriorchis astur* Sharpe, 1875

Plate 28

Other names: Long-tailed Serpent-eagle, Madagascar Forest Eagle

**DISTRIBUTION** Madagasy (c14°S to c19°S?); order 3?; thought possibly extinct for nearly 60 years, but recent records show continuing survival of small populations. Endemic to Madagascar, where probably confined to northern half of eastern ridge: until recently known only

from ten museum specimens collected during 1874–1930, one sight record in 1988 in general area of four or five possible observations during 1964–77, and one found dead nearly 300 km away in 1990; but since 1993 at least 15 repeatedly seen on Masoala Peninsula (where one even caught, ringed and radio-tagged, and one pair proved nesting) and a few others recorded elsewhere.



**MOVEMENTS** Likely to be sedentary or, at most, locally dispersive.

**HABITAT** Undisturbed primary rainforest, though has also been recorded in secondary growth at edge of dense forest. Usually within canopy and evidently extremely elusive. Sea-level to 1,200 m, perhaps mainly 400–1,000 m.

**FIELD CHARACTERS** Rather small and atypical snake-eagle, having shape and general brown and barred appearance like large accipiter, with short wings and long well-rounded tail; but curiously gentle expression, short deep bill, reduced grey cere largely hidden by facial bristles, large eyes, short erectile crest, heavily scaled and knobblily-looking legs, rather short toes and claws. Probably perches mainly inside canopy with rather upright stance; wings reach only base of tail. Sexes similar and female barely larger; juvenile separable on good view, particularly in fresh plumage; as adult after first moult.

**PERCHED Adult** Grey-brown to brown above with obscure dark banding, most obvious on scapulars, flight-feathers and browner tail; thin white bars on shoulder-edges (marginal lesser coverts) and sides of neck, sometimes faint light barring on nuchal crest; white below with dense dark bars of fairly constant width but increasing spread, so that the intervening white is narrower on throat and upper chest but becomes broader on breast and belly and almost takes over on lower flanks, crissum and especially undertail-coverts. **Juvenile** Lores and ear-coverts white with pale brown streaks (all dark on adult) and bases to nuchal crest may show as white mottling, so head slightly paler and less uniform; no white barring on shoulders but, in fresh plumage, thin white tips (longest on tail-coverts) and clearer dark banding all over grey-brown upperparts, also white tip to more pointed tail; below, dark barring on throat and chest slightly narrower, more widely spaced and more rufous in tone. (White tips on upperparts abrade, so that worn juvenile less immediately obvious.) **Bare parts** Adult eyes yellow or reddish-yellow, juvenile apparently brown or pale grey until, some time after first moult, turning yellowish-white and then yellow. Adult feet yellow, juvenile duller yellowish.

**FLIGHT** Mid-sized raptor with short rounded wings and long, fairly broad and graduated tail which, combined with darkish grey-brown upperparts and closely barred underparts, give impression of large accipiter; wingspan 1.7 times total length. **Adult/Juvenile** Darkish grey-

brown above with five to seven dark tail-bands; below, white wing-linings closely barred like adjacent body, while flight-feathers and tail drabber and greyer with dark bars not strongly contrasted; slightly paler bases to remiges probably cause lighter area along mid-wing.

**CONFUSION SPECIES** Female Henst's Goshawk [152] closely similar in size and plumage; considerable overlap in measurements and shape, apart from generally smaller wingspan and thinner and squarer tail. (Henst's also has typical accipitrine 'tooth-notched' upper mandible, whereas the cutting edge is nearly straight on the serpent-eagle.) In plumage, juvenile Henst's different enough, being streaked and blotched below like many other young accipiters; but adults much more confusable, being brown above and barred below. Henst's upperparts, however, are darker brownish-slate and quite plain apart from slight supercilia and obscure dark tail-bands, while underparts evenly barred from throat to belly. Even so, similarity is such that three serpent-eagle specimens in museums were originally misidentified as Henst's Goshawk. Other Madagascar accipiters [117, 144] much smaller.

**VOICE** Loud far-carrying *wah...wah...wah...wah...* often followed by lower *rugh*. Call of one in flight described as three-note and cuckoo-like.

**FOOD** Chameleons long known, from recorded stomach contents, to form at least part of diet, and those of genera *Calumna* and *Furcifer* were commonest items brought to the 1997–98 nest, forming, together with leaf-tailed geckos *Uroplatus*, a total lizard component of 82.75% of identified prey; next most numerous were frogs (including tree-frogs *Boophis*), which made up 15.8%. The male brought most of the chameleons, the female more geckos and frogs. Only two snakes were taken to the nest during 548 hours of observation over the whole nestling period. During post-fledging, a bat was also delivered. Elsewhere, a radio-tagged bird was also seen eating a fledgling Green Pigeon *Trogon australis* and an unidentified mammal. (See Thorstrom & René de Roland.) (Reported by local people to take small mammals, including lemurs, and chickens, but this probably all results from confusion with Henst's Goshawk [152].) Evidently forages by perch-hunting, regularly moving in and below canopy from tree to tree, also on forest floor, perhaps especially by water, seeking to dislodge potential prey resting or hiding in thick vegetation, epiphytic ferns, branches, trunks and leaf litter (see Thorstrom *et al.*). May also still-hunt, watching for movements by chameleons.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. On 18 September 1997 one pair 'was observed for three hours calling, chasing and moving together as if they were a breeding pair but exhibiting no signs of nesting activity' (Thorstrom & René de Roland).

**BREEDING** Only nest described was found on 7 November 1997 (with evidently half-incubated egg), in which chick hatched on 21 November and fledged on 22 January 1998, indicating likely nest-occupancy to be within October–February. Nest, 60 cm x 80 cm across and 18 cm deep, was on base of leaves, with twigs used only to form rim, and lined with green leaves, well concealed at 20 m above ground in large epiphytic fern

*Asplenium nidus* and supported by vines and by branches of the host tree *Potamoia capuroni*. Clutch 1. Incubation, unexpectedly by both sexes (similar to kites rather than serpent-eagles), 40+ days? Fledging 62 days; post-fledging dependence for 6 weeks. (See Thorstrom & René de Roland.)

**POPULATION** Although classed as 'critically endangered' because its population 'is probably extremely small, and its habitat is being severely fragmented by deforestation' (BirdLife International), at least this species is nowadays known to exist after nearly 60 years without an authenticated record (see Distribution). Its theoretical range has been calculated at 16,600 km<sup>2</sup> (BirdLife International). All records in the decade from 1998 were in fragmented forest reserves over some 340 km between Marojeje Reserve and Zahamena Special Reserve (possibly also in Mantady National Park 150 km farther southwest). In a special survey during 1993–98, 15 different individuals were detected at nine different localities throughout the Masoda Peninsula: 'on average, the distance between assumed neighbours or territorial birds was approximately 6 km' (Thorstrom & René de Roland). With one recorded exception ('relatively fearless': Sheldon & Duckworth), the species is generally wary, secretive and elusive, particularly but not only in the nesting season. Because it is thus easy to overlook

(though less so, now that the call is known), it seems possible on the data available that the population may be at the bottom end of the three-figure range. It has been suggested that the species may also occur farther south, but all the old specimen records were also within a similar distance of 440 km over almost identical latitudes between 15°S and 19°S. (An unconfirmed observation was, however, made in 1929 near Farafangana, 600 km farther south from Zahamena at almost 23°S.) Deforestation is the bird's greatest threat, but it is also affected by human disturbance and, because of its assumed predilection for chickens, and likely confusion with Henst's Goshawk [152], it is open to direct persecution.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 320–341 mm, tail 275–292 mm, tarsus 80–92 mm. **Weights** No data.

**REFERENCES** Benson *et al.* (1986), BirdLife International (2000), Collar & Andrew (1988a), Collar & Stuart (1985), Collar *et al.* (1994), Dee (1986), Eck (1986), Langrand (1986, 1990), Langrand & Meyburg (1984), Lavauden (1982, 1987), McNulty (1975), Meyburg (1979b), Milon *et al.* (1973), Morris & Hawkins (1998), Rand (1936), Raxworthy & Colston (1992), Sheldon & Duckworth (1990), Shuker (1995), Thiollay (1998), Thompson & Evans (1991), Thorstrom & René de Roland (2000), Thorstrom *et al.* (1995), Wilcove (1999).

## Accipitridae (j: gymnogenes or harrier-hawks)

### 89 AFRICAN GYMNOGENE *Polyboroides typus* A Smith, 1829

Plate 28

Other names: Banded Gymnogene, African Harrier-hawk

**DISTRIBUTION** Afrotropical (18°N to 35°S); order 6; widespread, but varying from rather uncommon in East Africa to locally common in West. Almost throughout sub-Saharan Africa: southwards from Senegambia, Guinea, Liberia, Ivory Coast, Ghana, Togo, Benin, Nigeria, southern parts of Niger, Chad and Sudan, western

Ethiopia and southern Somalia, except in desert areas (especially south Namibia and Botswana); also on Pemba.

**MOVEMENTS** Generally considered sedentary, except in southern Africa, where locally nomadic; in West Africa possibly some northward movement towards desert edge during rains.

**HABITAT** Quite varied: moist woodland, forest edges and clearings (less often in continuous forest), wooded savannah, hill country with wooded ravines and steep slopes, gallery trees by rivers and lakes; readily adapts to partly deforested areas and other habitats modified by people, such as cultivation with eucalyptus or coconut plantations, and even eucalyptus trees in towns; extends into thornbush along timbered river courses, and locally into desert along gorges. Sea-level to 3,000 m.

**FIELD CHARACTERS** Largish gangling hawk, curiously lightweight for its size, largely grey and black as adult, with weak bill, pinched bare face, and small pointed head mated at rear. Perches quite openly, or inside canopy, and easily watched during remarkable foraging techniques (see Food); long wings reach well down longish rounded tail (exceeding but not hiding distinctive pattern). Sexes similar but distinguishable when in pairs, and female averages only 3% larger but 26% heavier; juvenile distinct: as adult in third year.



**PERCHED Adult** Predominantly grey, with black blobs on scapulars and greater coverts (female with more and larger blobs), thin white tips and black ends to flight-feathers, and clear white central band on black tail; and abdomen and thighs usually neatly barred black and white, but uncommon grey morph has this barring all more or less replaced by grey; yellow facial skin flushes red in excitement. **Juvenile** Dark brown above, indistinctly rufous-edged, with blackish face and obscurely dark-banded tail, but dimorphic or polymorphic below: dark morph typically all dark but for little streaky whitish on breast and sometimes obscure rufous barring on abdomen; pale morph typically all whitish to rufous below, with dark-streaked chest and rufous or clearly dark-banded abdomen; but considerable individual variation, even from some parents (Pretoria Zoo). **Immature** Transition to adult variable: some possibly moult directly into adult plumage during second and third years; most pass through recognisable immature stage that is browner and more barred than adult; face yellows over this period. **Bare parts** Eyes dark brown. Adult cere and facial skin yellow, juvenile cere greenish-yellow and facial skin blackish. Feet yellow.

**FLIGHT** Mid-sized to rather large raptor with narrow projecting head, long broad wings of fairly even width and rounded at tips, and longish rounded tail; wingspan 2.5 times total length. Flies with frequent slow buoyant beats; glides and soars on flattish wings; large wing area and lightweight body give unusually low wing-loading and ability to forage in flight very slowly. **Adult** Looks mainly grey (wing-linings barred like abdomen) with obvious white band on black tail and very broad black tips and trailing edges to wings; yellow face often visible at fair ranges. **Juvenile** Brown with obscurely barred flight-feathers and tail, and – whether largely dark (typical dark morph), or whitish to rufous below with streaks, bars and central darker wing-band (typical pale morph) – usually best identified by characteristic shape, flight and behaviour. **Immature** Once grey feathering, banded tail and yellowish face start to appear in second-third years, pattern makes identification easier.

**CONFUSION SPECIES** Perhaps most likely to be confused, when perched in open, with chanting-goshawks [104–106] because of comparable size, grey plumage and barred underparts, but those have quite different shape and habits, red cere and legs, and no bare facial skin. In flight, too, they have differently shaped wings, no broad black trailing edges and, above all, no white tail-band. Last raises slight possibility of confusion in flight with Banded Snake-eagle [72] (slightly smaller, rather darker, with much white and less black on wings, and much broader white band on considerably shorter tail) and Lizard-buzzard [163] (far smaller, with orange-red bill and legs, white rump and quite different wing pattern).

**VOICE** Usually silent. Basic call in breeding season is long-drawn plaintive *su-eeeeee-oo*, used in various shortened or doubled versions, in contact, courtship and copulation, as well as in alarm; sometimes it is more mewed, at others whistled, and male is invariably higher-pitched. Also high *huweep-huweep-huweep* near nest.

**FOOD** Very varied: in West Africa, predominantly oil-palm fruits (cf. Palmnut Vulture [52]) plus small

numbers of reptiles (mainly lizards), small mammals (mainly rodents), adult and young birds, and beetles; but in eastern and southern Africa chiefly birds and their eggs and young, together with small mammals (including hole-roosting bats), reptiles and amphibians and, to small extent, insects and stranded fish. Most prey motionless or helpless, but often inaccessible to other predators. In West Africa forages over 140–150 ha, but elsewhere over at least 5–10 km<sup>2</sup>. Depending on availability of food, hunts mainly by low soaring or flapping flight, by still-hunting from perch to perch, or by methodically searching individual trees, cliff faces, house eaves and colonies of weavers, swifts and herons or, on foot, carefully covering sections of ground. Walks and runs up tree trunks with wings flapping for balance. Peers with small head into narrow crevices and reaches adult or young birds and small mammals by thrusting in one of its small feet on remarkable 'double-jointed' legs that can be bent 30° sideways or 70° backwards, as well as 150° forwards (fig. 33). Often also hangs from foliage or weavers' nests, or moves about upside-down, again with flapping wings. Forages regularly and systematically through same areas, especially in mornings and evenings.



Fig. 33. African Gymnogone *Polyboroides typus* [89] is able to reach into holes in trees and cliff faces because of its specially adapted intertarsal joints, and so take prey inaccessible to most other predators, especially hole-nesting birds and their eggs or young, and also bats and other small mammals.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs. Male displays in slow circling and switchback flights alternately rising with exaggerated beats and descending in short dives; if female is also on wing, he may dive at her, she roll over, and they briefly touch claws. Bare faces of both sexes flush red during copulation (also during incubation change-overs and at other times when pair-members meet at or near nest), then quickly return to yellow.

**BREEDING** November–May in West Africa, any month in East Africa (chiefly October–January), September–March in Zambia, and mainly September–February in southern Africa (rarely other months). Smallish to

relatively large nest of thin twigs, 60–70 cm (50–100 cm) across and 20–30 cm deep, lined with green leaves; at 10–21 m (5–30 m) in *Borassus* palm (especially West Africa), eucalyptus, baobab, euphorbia or other tall tree, usually well inside canopy in main or lateral fork, or at base of bush or tree growing from cliff or, rarely, in small cave or on cliff ledge. Clutch 1–2 (3); usually only 1 chick reared, occasionally 2. Incubation 35–36 days. Fledging 45–55 days.

**POPULATION** Commonest in parts of West Africa, where pair's territory may be reduced to 80 ha, probably least common and most patchily distributed in East and densely forested Central Africa; territories 5–10 km<sup>2</sup> in southern Africa. Although range very wide, irregular distribution indicates total population of, probably, under 1 million. No obvious threats, and species readily adapts to altered environments.

**GEOGRAPHICAL VARIATION** Two races.

*P. l. typus* (east Sudan and Ethiopia south through east DR Congo and East Africa to South Africa) Larger, paler, less heavily barred below.

*P. l. pectoralis* (West Africa east to west Sudan and

south to DR Congo and Angola) Smaller, darker, more boldly barred. Others, named from forests of DR Congo and neighbouring countries on still smaller size, darker coloration and black bars being broader than white ones, are not generally recognised.

Forms a superspecies with Madagascan Gymnogone [90] (which see for comments).

**MEASUREMENTS** *P. l. typus* ♂ wing 443–463 mm, ♀ 457–483 mm, ♂ tail 280–320 mm, ♀ 285–310 mm, ♂ tarsus 83–100 mm, ♀ 85–100 mm. *P. l. pectoralis* ♂ wing 373–396 mm, ♀ 379–405 mm. **Weights** *P. l. typus* 642–950 g. *P. l. pectoralis* ♂ 500–710 g (average 564 g), ♀ 580–820 g (711 g).

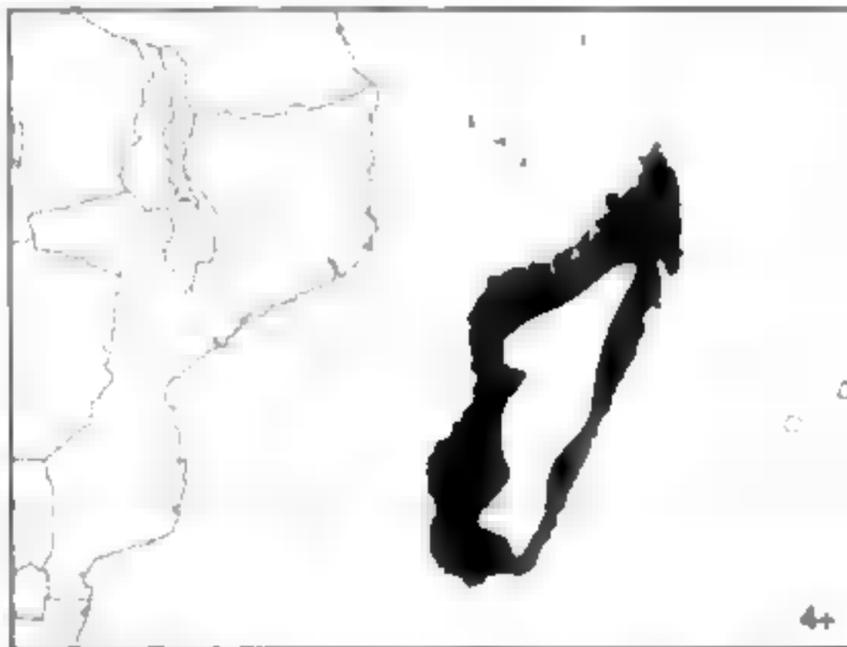
**REFERENCES** Benson & Benson (1975), Brosset & Erard (1986), Britton (1980), Brown (1972b), Brown *et al.* (1982), Burton (1978), Colebrook-Robjent (1974), Cooper (1980), Dean (1969), Ginn *et al.* (1989), Gore (1990), Grimes (1987), Kemp & Kemp (1998), Langham (1976), Maclean (1993), Nikolaus (1987), Pickford *et al.* (1989), Pinto (1983), Smeenk & Smeenk-Enserink (1983), Snow (1978), Steyn (1982) [includes many other references], Tarboton & Allan (1984), Thiollay (1975a/b/c/, 1976a/b, 1977c, 1978a), Thunro & Black (1981), Zimmermann *et al.* (1996).

## 90 MADAGASCAR GYMNOGENE *Polyboroides radiatus* (Scopoli, 1786)

Plate 28

Other name: Madagascar Harrier-hawk

**DISTRIBUTION** Malagasy (12°S to 26°S); order 4+; widespread and fairly common. Endemic to Madagascar; in most regions except deforested central plateau, where rare or absent.



**MOVEMENTS** Probably mainly sedentary, but evidently some nomadic.

**HABITAT** Typically forest and forest clearings, open woodland and wooded savannah, but has adapted to banana plantations and other exploited and degraded woodland areas; also sometimes seen in more open country, including palm savannah, steppe and, at least formerly, edges of rivers, marshes and ricefields. Sea-level to 2,000 m.

**FIELD CHARACTERS** Lightly built, gangling raptor very like African counterpart [89] (closest to smaller

West African race in size), though with relatively shorter wings and longer tail and legs; small bill, bare sides of face, small pointed head looking larger because of maned effect of short bushy crest. Perches mostly within canopy and may sit quietly for long periods in thick foliage; wings cover basal two-thirds of tail. Sexes similar and female only 0–15% larger; juvenile quite distinct; moults through intermediate immature stage to adult by early third year.

**PERCHED Adult** Grey head, chest and upperparts (paler than African species [89]), apart from variably white-tipped black remiges and tail, latter with broad white band across middle; wing-coverts variably tipped black and white, inner greater and longer scapulars also each marked with single black blob; uppertail-coverts barred grey and black; abdomen closely and evenly barred black and white. **Juvenile** Medium brown above with white-tipped mantle and, especially, wing-coverts; remiges and finely white-tipped tail with four dark bands and slightly broader subterminal; forehead, throat and variably rest of head white, more or less blotched brown, particularly on crest; whitish underparts heavily blotched brown on chest, more barred on abdomen, least densely on thighs and crissum. **Second-year** Moults slowly from juvenile to adult [cf. 89], so variable mixture of two plumages, but no distinct immature stage (cf. African Gymnogone [89]). **Bare parts** Eyes black-brown. Adult cere and bare face yellow (but variably pink early in breeding season and flushing redder in excitement); juvenile blackish-grey, but cere soon turns greenish-yellow and bare face-sides follow. Legs yellow, but adult's may become pinker. **FLIGHT** Mid-sized raptor with well projecting narrow head, longish broad wings with spread fingers, and longish rounded tail combining to give distinctive silhouette; wingspan 2.1 times total length. Slow buoyant

beats punctuated with glides on nearly level wings; commonly soars, also on flattish wings, often giving impression of being blown about by gusts of wind. **Adult** Single white band on black tail unmistakable; otherwise grey upperparts and head to chest, with barred abdomen and wing-linings, and contrasting black flight-feathers; black bill stands out as blob against yellow to pink cere and face. **Juvenile** Blotchy brown from above, with whitish head, rather obscurely banded flight-feathers and tail; from below, whitish head and crissum, rufous-blotched linings and breast, and coarsely barred abdomen distinctive, even though barred flight-feathers and tail reminiscent of other raptors; cere and face dusky-grey at first. **Second-year** See Perched.

**CONFUSION SPECIES** None; even juveniles readily identified.

**VOICE** Said to be noisier than African *Gymnogene* [89], particularly in flight, often uttering long shrill *peee-ee-ee-ee*.

**FOOD** Wide range, varying from insects and larvae to amphibians, reptiles, and eggs and helpless young of birds. Possibly also weak or injured mammals, to judge from behaviour of some lemurs at its approach, and one presumed female flying fox, about two-thirds weight of *Gymnogene*, apparently killed and carried 200 m. Forages in flight by transects or low quattering, and in sorties from open perches, but also still-hunts from dense foliage at forest edge. Characteristic close-searching methods similar to those of African counterpart [89]; likewise climbs about on trees, examining crevices, rotten wood, leaf-bases and epiphytes, but perhaps spends rather more time foraging on ground, inspecting termite mounds and ant-heaps, or peering under and turning over stones and dung for beetles and cockroaches; 'double-jointed' leg and pointed head similarly inserted into cavities, and wing often used as lever to overturn stones.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in year-round pairs. Mutual circling and undulating sky-dance perhaps similar to African counterpart [89]. One bird 'stalled, tipped forward and dropped with quivering primaries'.

**BREEDING** Few data. Recorded season July–November (Langrand), perhaps extending to February (B&A). Large nest of sticks at 10–15+ m in main fork of mature tree. Clutch usually 2. Incubation and fledging periods unknown.

**POPULATION** Where species locally common, average distance between roadside sightings only 8 km, but over all areas and habitats figure rose to 105 km or one bird per 3.1 hours (Langrand & Meyburg). Observations of this species from moving vehicles have limited significance because of its unobtrusiveness when perched, but breeding distribution extends patchily over some 450,000 km<sup>2</sup> and population must be at least in upper thousands. No immediate threats, particularly as able to adapt to some extent to degraded woodland and coconut plantations.

**GEOGRAPHICAL VARIATION** Monotypic. Forms a superspecies with African *Gymnogene* [89] and sometimes treated as conspecific, but well isolated, with no intermediate immature plumage (though that is a normal simplification in an island taxon), somewhat different proportions, and size closer to the more distant West African race of that species.

**MEASUREMENTS** ♂ wing 369–398 mm, ♀ 392–418 mm; ♂ tail 292–321 mm, ♀ 314–327 mm; ♂♀ tarsus 86–99 mm. **Weights** No data.

**REFERENCES** Appert (1972), Dec (1986), Goodman & Pidgeon (1991), Langrand (1990), Langrand & Meyburg (1984), Malcolm (1970), Milton *et al.* (1975), Safford & Wilkinson (1990), Salvan (1971), Thiollay & Meyburg (1981).

## Accipitridae (k: harriers)

### 91 SPOTTED HARRIER

*Circus assimilis* Jardine & Selby, 1828

Plate 33

Other names: Allied Harrier, Spotted Swamp Hawk

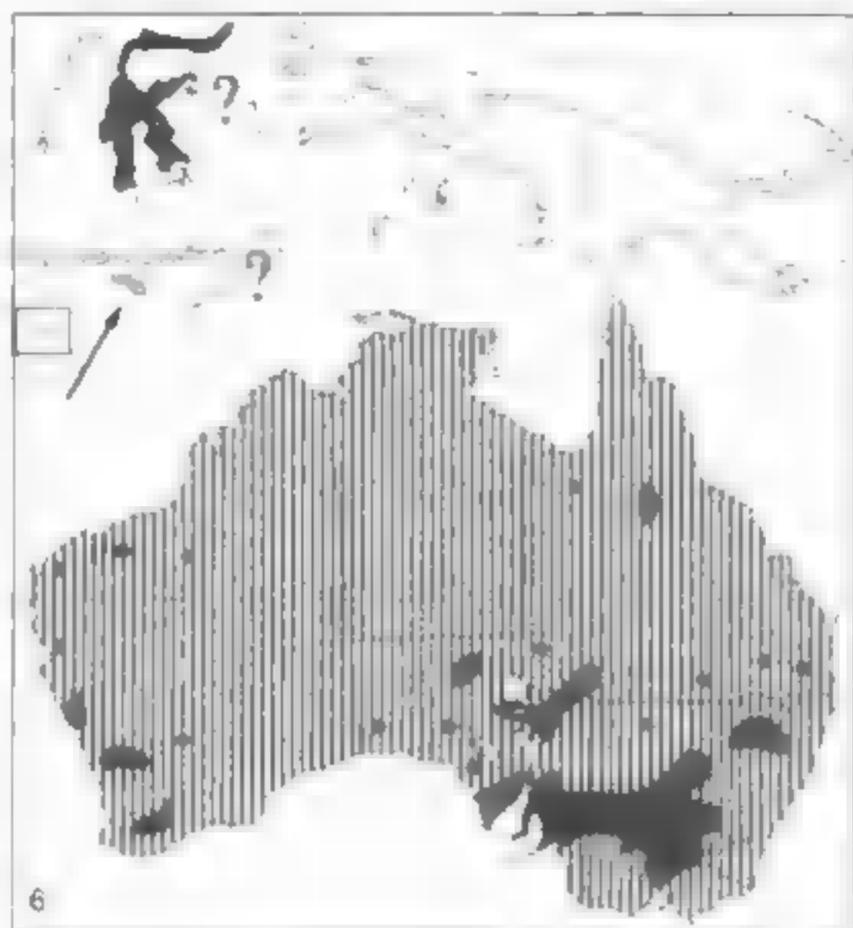
**DISTRIBUTION** Australasian and, in Wallacea, marginally Indomalayan (2°N to 39°S); order 6; never abundant, often scarce to uncommon, but wide distribution and locally common. Restricted to Sulawesi, much of Australia (but not breeding in extreme north, some inland areas and southeast coastal strip) and, in between, perhaps at least Timor in Lesser Sundas (though nesting not proved).

**MOVEMENTS** Various sedentary, nomadic and migratory; apparently resident in less arid areas of Australia, but elsewhere moves in after summer rain or when food abundant, at times staying to nest; also some southward movement in summer (October–February, even August–April) and northward in winter. Longest ringing recovery 1,650 km (southeast South Australia to southeast

Queensland). Vagrant to Tasmania. Also recorded Taliabu (east of Sulawesi) and, in Lesser Sundas, Sumba as well as Timor; uncertain whether any of these smaller Indonesian islands have breeding populations.

**HABITAT** Grassland, sandy or scrubby plains, subdesert, low thin thornbush, open grassy woodland and, especially, wheat and other crops with windbreaks or residual trees; locally hunts over coastal flats, ricefields and even swamps, but generally avoids wetlands. Sea-level to 1,500 m.

**FIELD CHARACTERS** Fairly large, slim and lanky harrier, slaty and rufous with white spots as adult, with typical owl-like facial ruff, but relatively long legs and tail. Often not shy; perches openly on ground, hummocks, ant-heaps, stumps, fences, bushes and trees; wing-tips well short of tail-tip. Sexes similar (exceptional



among harriers), but female 1–25% larger and perhaps averaging 40% heavier; juvenile quite different and still distinguishable after moult into immature stage in second half of first year, then becoming more or less adult during second year, but some juvenile and immature feathers retained into third year.

**PERCHED Adult** Mainly slaty blue-grey above and white-spotted rufous below, with grey-streaked head, chestnut face, blue-grey ruff, and white-spotted rufous inner shoulders; grey of upperparts also marked with dark slate and often edged or tipped whitish; primaries blackish, and tail dark-banded and white-tipped. **Juvenile** Basically dark brown above with buff to ginger tips and edges, which on head and shoulders are broad enough to form dominant colour; pale buff to rufous-buff below with fine dark streaks; tail patterned as adult, but browner. **Immature (second year)** More like adult after first moult, but browner-grey above, with brown streaks on head and face, and duller rufous below with white streaks; during next moult these white streaks gradually replaced by adult spots, starting on belly. **Bare parts** Adult eyes pale yellow, juvenile dark brown, becoming paler in second year. Cere pale yellow and feet yellow at all ages.

**FLIGHT** Medium-sized raptor, similar in size to Australasian Marsh Harrier [101], but slimmer (15–20% lighter) and longer-tailed, with long broad-based wings with often prominent fingers and tail slightly wedge-tipped; wingspan 2.4 times total length. Buoyant flight with gentle rhythmic beats and long glides; sails low over ground with wings in shallow V and tail-edges clearly upcurved; similarly soars with marked dihedral; often lowers one or both legs during both low sailing and high soaring; hovers with deep beats, hanging legs. **Adult** Mainly blue-grey above with black-tipped flight-feathers and banded tail; below, white-spotted rufous body and wing-linings contrast with whitish-grey and broadly black-tipped flight-feathers. (White spots on back, upperwing-coverts and wing-linings, as well as thin dark bars on secondaries, often not obvious at longer ranges.)

**Juvenile** From above, marked contrast of ginger head

and forewings, and pale yellowish rump, with blackish-brown flight-feathers and broadly barred tail; from below, pale rufous-buff body and wing-linings finely dark-streaked, whitish-grey flight-feathers much more obscurely barred than tail but with blackish tips and trailing edges. **Immature** Distinguished from adult by browner tone above and white streaks (rather than spots) below.

**CONFUSION SPECIES** Adult unmistakable. Because of very different appearance and pale rump, juvenile sometimes confused with adult Australasian Marsh Harrier [101], but that is clearly bulkier, with rounded (not wedge-shaped) tip to more lightly barred tail, and less buoyant flight; also rump white (not pale yellowish), forewings much darker above, and wing-linings contrastingly streaked. Other mistakes involve juvenile Square-tailed Kite [35] (distinctively long and barred primaries, squared or notched and less banded tail twisted in flight, much shorter legs) and Red Hawk [156] (more thickset, with flat head and crested nape, heavy legs and large feet, squared tail, less upswept wings in quicker flight).

**VOICE** Generally silent. Sharp high-pitched *wik wik wik* and rapid chattering *kikikikik...* uttered in various contexts, such as during copulation, when bringing food, and in nest defence.

**FOOD** Mammals (to size of bandicoots and rabbits), terrestrial birds (such as pipits *Anthus* and quails *Coturnix*), reptiles (especially lizards), and large insects; rarely carrion. Virtually all prey taken on ground; may occasionally catch birds just flushed or flying low, but generally not fast enough. Foraging methods typical of harriers (see Northern Marsh [100]), with low-level flights along vegetational interlaces or systematic transects in more open areas; prey then caught in sudden drop.

**SOCIOSEXUAL BEHAVIOUR** Often solitary or in pairs, but sometimes small groups of up to about five, which perhaps represent family parties. Unlike sexually dichromatic harriers, Spotted are monogynous and defend large non-overlapping territories. High-circling by male alone or pair together not uncommon, though probably less than Australasian Marsh Harrier [101]. Such soaring may be accompanied by mild flight-play, but other spectacular manoeuvres corresponding to those of most harriers apparently rare. In sky-dance, first described only in 1995, adult 100–200 m above ground performed series of steep undulations of perhaps 10 m amplitude, maintaining almost continuous beats with 'languid sweeping strokes, zigzags,' and half-rolls or twists and turns at peak of each undulation, this display lasting about a minute from initial sighting before bird glided down valley, where a second adult followed it; no calls heard, unlike in similar aerial display of Australasian Marsh Harrier. (Although observation was outside normal spring breeding season of species in region, a mouse plague there in winter 1995 may have provoked early breeding.)

**BREEDING** Main months July–December, but may nest at any time in arid interior, according to rainfall and food supply, while elsewhere second peak in March–June raises question of biannual breeding if prey abundant. Smallish to large, flat and rather flimsy nest of thistle stems and light twigs, 40–70 cm across and



Fig. 34. Spotted Harrier *Circus assimilis* [91] is the only harrier that normally nests in trees, here in eucalyptus.

16–39 cm deep, lined with green leaves, at 2–15 m in arboreal sites varying from main fork of broken or stunted tree to outer foliage of tall eucalyptus (see fig. 34); also recorded on telegraph poles. (Only harrier that normally breeds in trees, but see Hen [93].) Clutch 2–3 (2–4). Incubation 32–34 days. Fledging 36–43 days; dependence 6+ weeks.

**POPULATION** In Australia, 134-km<sup>2</sup> area in northwest Victoria held 17 nests in 1980 (7.9 km<sup>2</sup>/pair) but only two in 1981, and none in 1982 (drought year); ten nests along 140 km of telegraph poles on treeless Nullarbor Plain. In Sulawesi, though long regarded as local and uncommon, now seen regularly on journeys through open country and undoubtedly benefiting from increased deforestation. Even though patchily distributed elsewhere, wide range over more than 7 million km<sup>2</sup> suggests population probably at least in hundreds of thousands. Less likely to be at risk than harriers dependent on wetland habitats.

**GEOGRAPHICAL VARIATION** Monotypic. Birds from northern Australia, Sumba and Timor ('*rogersi*') and Sulawesi and Taliabu ('*quirundus*') have been distinguished as smaller and more richly coloured, but overlap in size considerable and knowledge of origins of migrants inadequate.

**MEASUREMENTS** ♂ wing 368–412 mm, ♀ 414–467 mm; ♂ tail 232–273 mm, ♀ 266–297 mm; ♂♀ tarsus 85–107 mm. **Weights** ♂ 412–537 g, ♀ 530–745 g.

**REFERENCES** Baker-Gabb (1982a, 1984b/c, 1985a), Baker-Gabb & Fitzherbert (1989), Blakers *et al.* (1984), Copper & Copper (1981), Debus (1995), Hollands (1984), Klan (1985), Klapste & Klapste (1982), Lowe & Lowe (1976), Marchant & Higgins (1993), Meyburg & van Balen (1994), Olsen & Marples (1993), Olsen *et al.* (1993a), Schodde & Tiedemann (1988), Schrader (1985), Tiley (1985), van Balen (1994), White & Bruce (1986)

## 92 BLACK HARRIER

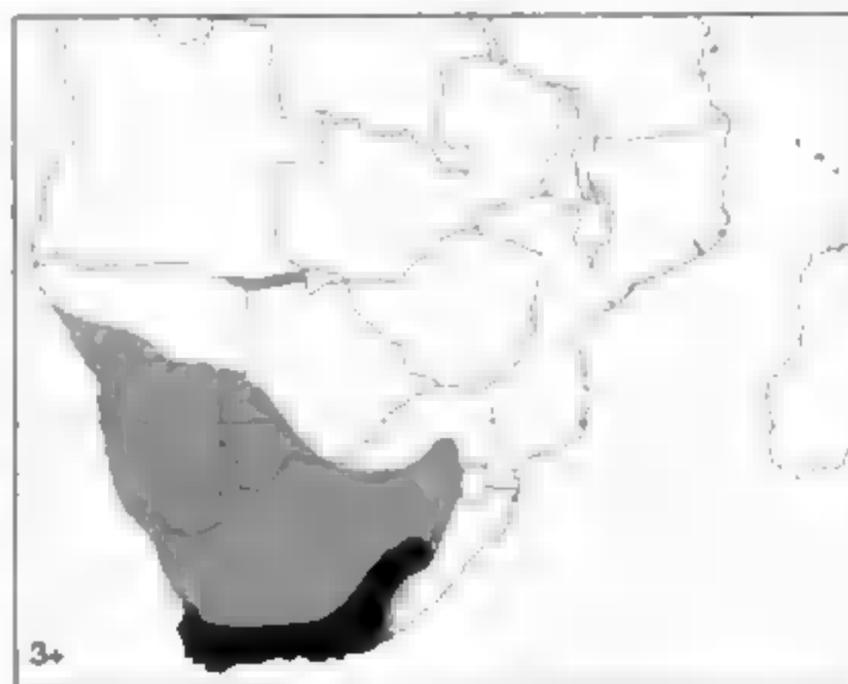
*Circus maurus* (Temminck, 1828)

Plate 30

**DISTRIBUTION** Afrotropical (mainly 26°S to 35°S, but isolated breeding population at 19°S and non-breeders regularly extend north to 22–20°S); order 3+; widespread, and locally common with high densities; still classed as vulnerable, but no longer endangered (as formerly believed when probably under-recorded). Endemic to southern Africa; breeding mainly in winter rainfall areas in southwest and east/southeast of South Africa, also Lesotho and tiny isolated population in northwest Namibia.

**MOVEMENTS** Various sedentary, nomadic and even migratory: some remain all year within breeding range, but numbers decrease during January–July, at which season most regularly recorded in eastern South Africa and Lesotho, and in western South Africa north into lower two-thirds of Namibia and extreme southwest Botswana.

**HABITAT** Although occasionally hunting among tall shrubs, and sometimes even breeding at wetland edges, found mainly in dry open habitats with short vegetation



and bare patches, often far from water; subdesert or dry uplands with low scrub, short grassy plains, young wheatfields and other agricultural land. Sea-level to 3,000 m, but mainly below 2,000 m.

**FIELD CHARACTERS** Mid-sized and rather thickset harrier, brownish-black as adult. Perches on ground, mounds, posts or, occasionally, pylons; tips of short wings only two-thirds down relatively long tail. Sexes similar (like most southern harriers), but female averages over 7% larger; juvenile distinct.

**PERCHED Adult** All brownish-black except for grey-banded tail, with thin strip of grey on primary coverts and primaries broadening on to secondaries; at close range, thin white edges on lower abdomen and thighs; bare parts orange-yellow. **Juvenile** Dark brown above with rufous-buff edges to wing-coverts; more obvious facial ruff than adult, emphasised by whitish-buff supercilia, nape and throat; buff below, heavily streaked and blotched with dark brown on breast but hardly marked on abdomen; bare parts yellow. Presumably moults into adult plumage in latter part of first year: head and upper breast may be moulted first, as in other harriers, thus producing brown and buff stage with black head and chest. **Bare parts** Eyes, cere and feet all yellow, brighter on adult.

**FLIGHT** Smallish to mid-sized raptor with harrier shape, but relatively longer tail, thickset appearance emphasised by short and rounder-tipped wings (which therefore look broader); wingspan 2.2 times total length. Action much as other harriers (see Northern Marsh [100]), though perhaps slightly faster beats. **Adult** Mainly black, including forewings and wing-linings, with white rump and banded tail; but black-tipped primaries and secondaries otherwise largely grey above and strikingly contrasted white below. **Juvenile** Also has white rump and clearly banded tail; otherwise mainly brown above with grever-based primaries, and buff below with heavily blotched chest, lightly blotched flanks and wing-linings, barred secondaries and whitish-based primaries (recalling adult pattern).

**CONFUSION SPECIES** Adult unmistakable: only other blackish harriers with white markings that could conceivably occur in same range, as migrants during northern winter, are melanistic morphs of Montagu's [98] (slender shape, no white rump, white-based primaries only and, on male, plainer tail) and male Northern Marsh [100] (longer wings, no white rump, plain grey tail, pale mid-wings only with much less contrast). Combination of white rump, banded tail, pale-based primaries, and buff underparts heavily blotched on breast but only lightly elsewhere also makes juvenile distinctive. **Moulting juvenile** with black head and chest on record as being temporarily mistaken for adult Black-chested Snake-eagle [69].

**VOICE** Usually silent. Main breeding call is mellow *pi-pi-pi-pi...*, used for contact and in courtship, as well as by female soliciting food. Shrill whistled *seereu* appears different. Like other harriers, chatters in alarm or aggression.

**FOOD** Small birds (up to c350 g), rodents (mice and vlei rats), amphibians, reptiles, insects (grasshoppers, beetles, caterpillars); also nidifugous chicks, birds' eggs, occasionally carrion. At times still-hunts from perch and, more rarely, catches flying birds. But most prey hunted by low flapping-and-gliding flight typical of harriers (see Northern Marsh [100]) and then caught on ground by

pounce, sometimes after brief 'hover' with slow beats and fanned tail.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, probably roosting singly. Three or four pairs may breed in loose group, with nests no more than 50 m apart; some evidence of occasional polygyny. Male soars over breeding area and uses switchback display-flight, calling at top of each rise. He brings food to mate with aerial pass typical of harriers. Copulation on ground.

**BREEDING** Occupied nests likely August–December, possible July–February. Smallish flat pad of grasses or sedges, sometimes on base of sticks, 35–45 cm across and c5 cm deep; often on dry ground, well hidden among long grass, wheat, or low scrub, less frequently among wet grass, young reeds or sedges in marshy (though not really waterlogged) areas, where may be raised up to 50 cm off ground. Clutch 3–4 (2–5). Incubation 34–35 days. Fledging 35–41 days.

**POPULATION** Although at one time feared in danger of extinction, that was probably through being overlooked: seen more frequently since 1960s, as result of more observers and increased awareness, the species was found to be regular in parts of South Africa where not previously known. Despite local increases, decreases and even extinctions – perhaps through fluctuations in populations of small mammal prey – its numbers are believed to have been stable, without significant change, throughout 20th century. Still classed as vulnerable, however, because there are thought to be under 1,000 individuals (of which fewer than 100 are in protected areas) and, though the entire range encloses 1 million km<sup>2</sup> (up to 1.5 million km<sup>2</sup> in non-breeding season), breeding pairs are sometimes concentrated at high densities of up to 1 pair/1 km<sup>2</sup> in, for example, South Africa's West Coast National Park. The isolated population in Namibia is thought to involve no more than five pairs. The species now also heavily depends on private farmland. Unlike African Marsh Harrier [99], not directly threatened by drainage, but uncontrolled burning of low scrub and grassland habitats for conversion to agriculture is a serious problem and, though many pairs then readily adapt to cultivation, pesticide residues result in low hatching success and nests are also at risk from cereal harvesting. (See BirdLife International.)

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 331–347 mm, ♀ 363–370 mm, ♂♀ tail 230–265 mm, ♂♀ tarsus 63–71 mm. **Weights** No data.

**REFERENCES** Barnes (2000), BirdLife International (2000), Brown *et al.* (1982), Ginn *et al.* (1989), Harrison *et al.* (1997), Howe (1989), Hustler (1976), Kemp & Kemp (1998), Kieser & Kieser (1977), Maclean (1993), Pickford *et al.* (1989), Seigfried (1992), Sinclair *et al.* (1993), Snow (1978), Steyn (1982), Tarboton & Allan (1984), Thiollay (1994), Uys (1978), van de Merwe (1981) [includes many other references], van der Merwe & Uys (1979).

93 HEN HARRIER  
*Circus cyaneus* (Linnaeus, 1766)

Other name: Northern Harrier (includes American *hudsonius*)

**DISTRIBUTION** Palearctic and, in winter, marginally Indomalayan (70°N to 38°N, winter 60°N to 18°N, more casually in east to 3°N); order 6; widespread, locally common and even increasing, but probably now generally in decline and has withdrawn from some more southerly nesting areas. Breeds northern Eurasia: Ireland, north and west Britain (Hebrides and Orkney through Scotland to north England and central Wales) and locally in at least 16 countries of continental Europe from Fennoscandia and north Russia south to north Spain, France, Germany, Czech Republic, Slovakia and Ukraine, possibly also Hungary, Croatia and Georgia; thence almost right across Asia, east to upper reaches of Anadyr, from about (or somewhat north of) Arctic Circle south to northern Kirghiz Steppes, north Mongolia, Manchuria, Ussuriland, Sakhalin and Kamchatka, with outpost in Tien Shan and westernmost Chinese Turkestan.

**MOVEMENTS** Entirely migratory in north and east continental Europe and throughout Asia, but only partial and short-distance migrant in west Europe. Thus, some west European birds more or less sedentary, while others dispersive or nomadic but, apart from relatively few reaching northwest Africa, seldom moving farther south than Iberia, Mediterranean islands and Turkey. Those wintering in west Europe include proportion from Fennoscandia and east Europe: Finnish-ringed recoveries at over 2,000 km in England, France and Italy. Southward to southwestward movements in Europe mainly mid September–October (end August–mid November) and return mainly March (end February–April). Asiatic birds travel much farther, wintering in rather narrow band from Turkey, Syria, Lebanon, Israel, Iraq, Iran and Turkestan through northernmost parts of Pakistan, India and Burma to southern China and north Laos, south Korea and Japan; present north India September–April/May and Japan late October–early November–

March/early April. Much scarcer south to North Africa, Saudi Arabia, Baluchistan and northwest Thailand, straggling to Yemen, peninsular Malaysia, north Borneo (surprisingly regarded as 'scarce winter visitor'), Taiwan, Nansei-shoto and Izu-shoto; has also wandered to Faroes and Iceland.

**HABITAT** Wide variety of open country with low ground cover: moorland, heath, open taiga, steppe, cornfields, marshy wetlands, dunes, low scrub and, regionally, young conifer plantations; also other cultivation, higher plateaux, rolling hills, semi-desert and coastal areas on passage and in winter. Sea-level to 3,000 m, breeding mainly below 1,200 m, but to 5,000+ m on passage.

**FIELD CHARACTERS** Mid-sized harrier, male grey and white with black wing-tips, all plumages white-rumped, with typical facial disc, and longish wings, tail and legs. Perches on ground, mounds, fence posts, stone walls, reeds and other low vantage points, only locally on trees; wing-tips reach well down tail, but short of tip. Sexes dissimilar, and females usually obviously larger, averaging around 11% bigger (up to 21%) and about 54% heavier; juveniles easily distinguished, but much like respective adult after first moult, males not fully so until after second or third.

**PERCHED Adult male** Head to chest and whole upper-parts look rather uniformly blue-grey, variably tinged brown on back of head and nape, but whiter on forehead and around eyes; silvery-grey tail and contrasting black wing-tips; white uppertail-coverts normally hidden when perched; lower breast and abdomen usually plain white, but sometimes slight grey mottling on flanks and thighs. **Adult female** Face pattern includes creamy supercilia and orbital areas divided into two by dusky line from lores through eyes, but contrasts less marked than on other ringtail harriers and no clear crescent on cheeks, though facial disc outlined by faint collar right across throat, all combining to give somewhat owl-like effect; otherwise dark brown above, with buff to



rufous-buff edges producing more obviously streaked crown and rear neck than other ringtails and fairly conspicuous mottled paler area on median coverts; white uppertail-coverts show faint pale rufous streaks at close range; central tail grey-brown and sides more cinnamon, all with three to four blackish bars and broader subterminal band behind whitish or pale rufous tip; cream to buff below, variably streaked with brown, most strongly on breast, and more blotched with brown to rufous-brown on flanks and thighs. **Juvenile** Very like adult female (much more so than in most other harriers) and not always distinguishable in field, especially in worn plumage, but cheek-crescents generally slightly more pronounced and sometimes much more, then making face look darker (but crescents never sharply outlined, and relatively little white below eyes; cf. Pallid/Montagu's [96, 98]); wider and more rufous edges above in fresh plumage give warmer tone to crown and median wing-coverts; subterminal tail-band narrower; and, below, ground colour generally warmer buff to rufous-buff with narrower and more even streaking, not blotched on flanks (rarely, streaking below more or less confined to upper breast and neck-sides, not unlike Northern Harrier [94], then much closer to Pallid/Montagu's). **Immature male** Though moult probably begins late in first winter, it continues right through first summer and even into second winter, with grey, white and black gradually taking over from worn faded juvenile leathers; when complete, second-year male much like adult, but grey upperparts somewhat tinged brown, especially on forehead, nape and lower back, and white underparts usually show few scattered rusty-brown spots, streaks or bars, sometimes more on lower breast and crissum. **Bare parts** Adult male eyes orange-yellow; female brown, then yellow after two to four years, becoming very pale in oldest birds; juvenile male yellow, female pale brown becoming yellower with age. Adult cere yellow, juvenile greenish-yellow, turning yellow. Legs yellow. **FLIGHT** Medium-sized raptor with longish wings and tail among other characteristics of harriers, and intermediate in shape between Pallid/Montagu's [96, 98] and marsh harrier complex [99–102]; wings quite broad with rounded tips (five clear fingers), and tail also well rounded (juvenile wings less broad, with more S-curved trailing edges); wingspan 2.4 times total length. Sometimes forages with continuous wingbeats, but much more often several leisurely flaps and then short glide, usually on V wings though occasionally flat or, more rarely, even slightly arched; soars with wings raised in shallow V. **Adult male** Looks rather uniformly grey above (though darkest on back and palest on secondaries) but for white patch on uppertail-coverts, boldly contrasting black wing-tips (outermost six primaries), and generally inconspicuous dark trailing edges to wings (most marked on younger birds); these trailing edges more obvious from below, when otherwise all white but for black wing-tips and well-demarcated grey throat and chest; lateral tail-feathers very obscurely barred grey and white. **Adult female** See 'Perched' for face pattern; otherwise dark brown above with large white rump-patch, clearly banded tail (dark subterminal broadest) tinged cinnamon only at sides; in optimum conditions, also rather inconspicuous lighter diagonal on inner wings, thin barring showing up on paler-based primaries, and streaky crown and neck; creamy-buff below, with

broad brown streaks on throat to breast, rusty-brown blotches on flanks and thighs to crissum, and more solidly rusty-streaked wing-linings (though these and pale bands on underside of tail generally less rufous than on females of Pallid and Montagu's); thin but fairly even dark barring on undersides of primaries, broader banding on slightly darker secondaries (where trailing edges slightly broader than other two dark bands, and pale bands whiter than on females of Pallid and Montagu's). **Juvenile** Very like adult female; see 'Perched' for face pattern and general colour tones; from above in flight, brighter diagonal patch on median coverts, pale line along tips of greater, and narrower subterminal tail-band; from below, even when warmer tinge of fresh plumage lost, thinner streaking on breast, streaks (rather than blotches) on lower flanks, thighs and crissum, slightly grever secondaries with less clear-cut dark bars, and paler-based primaries (rare individuals with unstreaked lower breast and belly can resemble young Pallid/Montagu's, but still show typical underwing pattern and five-fingered wing-tips of Hen). **Second-year male** See 'Perched' for moult stage; once contour-leathers replaced, brown tinges to grey of, especially, head and lower back can be difficult to see in less than good light but, below, some rusty streaks and other marks generally visible on white abdomen and crissum, sometimes also dusky mottling on larger wing-coverts; two outermost juvenile primaries (p9–10), by now faded to brownish-white, along with old secondaries, often retained through second winter (leaving wedge-shaped black tip; cf. Pallid); new secondaries and tail-feathers sometimes thinly barred below.

**CONFUSION SPECIES** All plumages need to be distinguished, at appropriate seasons, from Pallid Harrier [96] in eastern Europe, western Asia and parts of North Africa, and from Montagu's Harrier [98] in western Europe as well, though those are both smaller and, in typically more buoyant flight, have longer-looking, narrower and more pointed wings (four fingers, rather than five); at rest, wing-tips closer to tail-tip; also, full adult males do not have a white rump. Adult male Montagu's has black bar across secondaries above and two below, while grey of breast merges into rufous-streaked abdomen and wing-linings; adult male Pallid sometimes looks as dark as Hen above, but usually much paler plain whitish-grey, and largely plain white below, without hooded effect and only narrow wedge of black on outer primaries. Immature males in transitional plumage (first winter to second winter, especially first summer) need to be distinguished as such because they may show characters of one of the other two (e.g. rufous streaks on abdomen, dark bars on retained juvenile secondaries, wedged black wing-tips). Adult female and juvenile Pallid and Montagu's distinguished by shape (see above) and more distinctive face pattern (less owl-like); see those texts for more subtle differences. For distinction from possible vagrant Northern Harrier [94], see that species.

**VOICE** Generally silent except near nest site, but occasionally chatters when disturbed at communal winter roosts. In courtship flights both sexes use fast dry cackling; sky-dancing male *chuk-uk-uk-uk-uk...* and female softer higher *kek-ek-ek-ek-ek...* Harsher, sharper versions uttered, particularly by female, when intruder near nest.

Female also uses whistled squealing wail in various contexts, ranging from courtship flights (alternated with chattering) to food-call and soliciting. Male bringing prey summons female from nest with low soft chuckle.

**FOOD** Chiefly birds (especially passerines and, in breeding season, young ducks, gamebirds, waders) and small rodents (especially voles, which dominate diet in Fennoscandia); more locally or more occasionally, young rabbits, amphibians (mainly frogs), reptiles (mainly snakes), birds' eggs, carrion, and insects (notably orthopterans in eastern Asiatic Russia). Males take prey up to c500 g, females recorded to 612 g. Forages by low flaps-with-glides, either quartering to and fro over open ground or by transect-flights along interfaces between habitats, usually at heights of 1–4 m; flies more slowly and lower when hunting small mammals and other ground prey (20–30 km/h), faster and slightly higher when hunting birds (40+ km/h); when prey sighted, makes sudden pounce or tail-chases. Sometimes still-hunts for ground prey from low mound. Pirates other predatory birds of open country (e.g. Montagu's Harrier [98], Common Kestrel [277], Short-eared Owl *Asio flammeus*).

**SOCIOSEXUAL BEHAVIOUR** Usually solitary, but small numbers may congregate at abundant food sources, sometimes loose groups on autumn migration and, outside breeding season, communal roosts of, rarely, up to 35; sometimes loosely social breeder, and males may be polygynous with up to six females. Aerial displays, often accompanied by calling, include single or mutual high-circling, stoops, chases, rolls and talon-presentation. Male's sky-dance varies from shallow undulations, often quite low down, to series of rollercoaster plunges and steep climbs in range 3–40 m above ground, with twists, rolls, spirals and loops, and much calling. Aerial food-passes or drops by male to female spectacular.

**BREEDING** End April–September, mostly May–August. Variable pad, heap or platform of grasses, sedges and other local materials, locally heather, sometimes birch and other twigs, 30–90 cm across and 5–45 cm high, usually in dense ground vegetation of dry or marshy areas, including crops, low scrub and reedbeds; tree-nesting recorded in one area of Ireland. Clutch 4–6 (3–12). Incubation 29–31 days (29–39 for whole clutch). Fledging 32–42 days, but young semi-nidicolous after second week; dependent for several further weeks.

**POPULATION** Breeding regular in 18 European countries (and recorded or suspected in at least another eight), but in much of the west numbers are small and distribution scattered, with densities of no more than 5–10 pairs/100 km<sup>2</sup> generally, though up to 40 pairs/100 km<sup>2</sup> in north Netherlands in early 1980s. Estimates,

mostly from mid to late 1980s and early 1990s, suggest total European population between 23,500 and 26,000 breeding pairs: the bulk made up of 15,000+ pairs in European Russia, 3,000 in Finland, 1,000–2,000 in Sweden and 2,800–3,600 in France, with several hundreds in Scotland, north Spain, Estonia and Belarus, and 100 or more in Ireland, Netherlands and Germany. But the vast trans-Eurasian breeding range takes in over 15 million km<sup>2</sup> and the Asiatic part, where the species is 'common in places' with 'large numbers', is about three times the size of European Russia. If, on that basis, an Asiatic population of 45,000 pairs is assumed, a possible grand total of 70,000 pairs is indicated. In Fennoscandia, and presumably in at least parts of eastern range, too, annual numbers fluctuate greatly according to levels of vole populations (see Food). Second half of 20th century has seen increases or spreads in Scotland, Sweden, Finland and Netherlands, but declines in most other west European countries, partly through pesticides, more particularly through habitat changes (agriculture, drainage, forestry) and, in some areas, severe persecution. In Britain, significant decrease in clutch size noted since early 1980s, coupled with continued illegal persecution to present day, has led to serious concern over species' potential to maintain numbers.

**GEOGRAPHICAL VARIATION** Monotypic. Often treated as conspecific with Northern Harrier [94], but adults of latter are intermediate in various respects between Palearctic Hen Harrier and Neotropical Cinnereous Harrier [95], and juveniles of Hen differ markedly from those of American forms. All three are geographically isolated and could be considered distinct races of one species, or three species forming a superspecies, which is the course followed here.

**MEASUREMENTS** ♂ wing 323–362 mm, ♀ 358–392 mm; ♂ tail 200–225 mm, ♀ 210–255 mm; ♂ tarsus 65–73 mm, ♀ 70–80 mm. **Weights** ♂ 300–400 g, ♀ 370–708 g.

**REFERENCES** Ali & Ripley (1978), Balfour (1957, 1962, 1963), Balfour & Cadbury (1979), Balfour & Macdonald (1970), Beaman & Madge (1998), Brazil (1991), Brazil & Hanawa (1991), Brown *et al.* (1982), Cheng Tso-hsin (1987), Clark & Schmitt (1999), Cramp & Simmons (1980), Delin & Svensson (1988), Dementiev & Gladkov (1951), Etchécopar & Hùc (1978), Flint *et al.* (1984), Forsman (1999), Genschel (1986, 1995), Gibbons *et al.* (1993), Glutz von Blotzheim *et al.* (1971), Grimmett *et al.* (1998), Hagemeijer & Blair (1997), Handrinos & Akrivotis (1997), Handrinos & Demopoulos (1983), Harris *et al.* (1989), Hou *et al.* (1990), Kjellén (1992), Lontkowski & Skakuj (1995), MacKinnon & Phillipps (1993), Marchant *et al.* (1990), Martin (1992), Picuzzi (1978, 1980, 1984), Porter *et al.* (1981, 1996), Redpath (1992), Roberts (1991), Scharf & Balfour (1971), Schipper (1973, 1977, 1978), Schipper *et al.* (1975), Shirihai (1996), Shirihai *et al.* (1986), Svensson (1971), Utendörfer (1989), Watson (1977).

## 94 NORTHERN HARRIER

*Circus hudsonius* (Linnaeus, 1766)

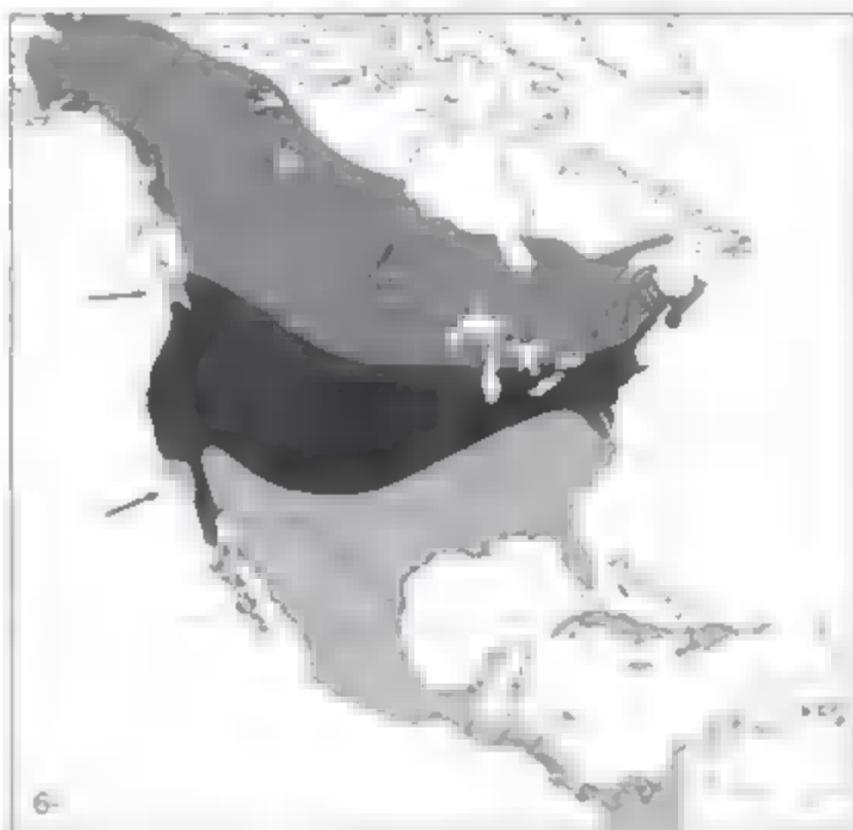
Plate 29

Other names: American or North American Harrier, Marsh Hawk

**DISTRIBUTION** Neartic and, in winter, also northwest

Neotropical (69°N to 30°N, winter 50°N to 4+°N); order 6; widespread and fairly common. Breeds North and, marginally, Central America: all but far north of Alaska and Canada (south from Yukon, southwest half of

Northwest Territories, Manitoba, Ontario, south Quebec) through western and northern USA (south to California, north Arizona and New Mexico, northernmost Texas, northwest Oklahoma, central Missouri, Illinois, Indiana, Ohio, Pennsylvania, Maryland) into far northwest Mexico (north Baja California).



**MOVEMENTS** Alaskan and Canadian populations almost entirely migratory, those in USA partially so or dispersive. Leaves northern breeding grounds August–October, returns March–May. Winters or wanders, September–April–May, in extreme southwest and southeast Canada (southern British Columbia, New Brunswick), almost all of USA (south from Washington, central Montana, South Dakota, southern parts of Minnesota, Wisconsin and Michigan, and New England and Nova Scotia) and much of Mexico (only transient eastern Yucatan); more uncommonly, October–March and occasionally to early May, in Central America (especially Pacific slope) and Caribbean islands to Panama and Puerto Rico; rarely, mostly November–December, to north Colombia and northwest Venezuela. Sight records of vagrants on Hawaii (Oahu, Midway) perhaps more likely to apply to this species than to Hen Harrier [93].

**HABITAT** Any open country – prairies, grasslands, young crops, plough – but especially wetlands, which almost essential for nesting (more so than Hen [93]); in winter, chiefly marshes, wet savannahs and ricefields. Sea-level to 2,800 m, breeding mainly below 1,500 m.

**FIELD CHARACTERS** Mid-sized harrier, male blackish-trimmed grey and rufous-spotted white, all plumages white-rumped, with typical facial disc, longish wings and tail, and longer legs than allospecies [93, 95]. Perches on ground, mounds, reeds, posts, seldom on trees; wing-tips reach well down tail, but short of tip. Sexes dissimilar, and females usually obviously larger, averaging around 9% bigger (up to 23%) and about 45% heavier; juvenile easily distinguished, but much like respective adult after first moult, male not fully so until after second or third.

**PERCHED Adult male** Whole head to chest grey to blue-grey, but whiter on forehead and around eyes; rest of upperparts somewhat mottled by darker grey subter-

minal tips to many feathers, most noticeable on median and greater coverts and, especially, secondaries; white uppertail-coverts usually hidden when perched; grey tail whitish towards sides, all with four to five obscurely darker grey bars of which subterminal usually broader and more pronounced; underbody white with variable rufous spotting, often most marked on lower breast, sometimes extending to belly, more thinly but conspicuously on flanks, thighs and crissum. **Adult female** Eye-patches and cheek-crescents quite pronounced (cf. Hen Harrier [93]); otherwise, dark brown above, variously edged with buff to tawny, so more or less streaked on head over and behind pale outline of prominent facial disc, and showing mottled pale patch on median coverts; white uppertail-coverts (when visible) have inconspicuous pale rufous streaks; tail pale grey-brown in centre and cinnamon-buff at sides, all with two to three dusky bands of equal width and broader subterminal behind whitish tip; creamy below, heavily streaked with dark brown to breast, more lightly on lower abdomen with tendency to rufous spots on flanks and thighs. **Juvenile** Broadly like adult female above, but still darker, with more contrasting face markings, usually more prominent pale edges on head, and more rufous (fading to buff) on median coverts; below, whole underbody and thighs rich rufous (fading during first year through cinnamon-rufous and cinnamon to pale buff and even creamy) with dark streaking confined to chest and flanks. **Immature male** See 'Flight'. **Bare parts** Adult male eyes yellow, female brown at first but turning yellow over two to six years; juvenile male pale grey to grey-brown, female brown. Cere greenish-yellow to yellow. Adult legs oranges-yellow, juvenile more yellow. **FLIGHT** Medium-sized raptor with usual harrier characters, closest to Hen and Ginnereous [93, 95] in size and shape, including longish wings and tail, but hands tend to look more tapered and tail slightly squarer than former; wingspan 2.4 times total length. Typical buoyant action of few leisurely beats and then short glide; glides on V wings, or with hands flatter when not hunting; usually soars with wings in shallow V, sometimes almost level. **Adult male** Predominantly grey above, but wings have well-defined black ends (five outermost primaries) and distinct dusky trailing edges (blackish on tips of inner primaries and, more strongly, secondaries); behind white rump, grey tail (whitish-edged when spread) shows four to five obscure bars and bolder subterminal; some white on forehead and around eyes; below, grey throat and chest give hooded look which, with same pattern as above of black wing-tips and trailing edges, stands out against otherwise mainly white or whitish underparts variably (but not very obviously) flecked with cinnamon-rufous on, chiefly, breast, flanks, axillaries and thighs. **Adult female** All dark brown above, apart from whitish face markings emphasising dark cheek-crescents, tawny-buff diagonal patch on inner wings, paler barred inner primaries, grey-brown bands (more cinnamon at edges) on whitish-tipped tail and, most obviously, bold white rump-patch; creamy to buff below with dark brown streaks, heaviest on forepart of body, more rufous on flanks, thighs, crissum and leading edges of wing-linings; undersides of flight-feathers boldly banded light and dark, but secondaries greyer and combine with heavily dark-streaked greater and median

coverts to form darker inner wings contrasting somewhat with pale primary windows. **Juvenile** Looks darker than adult female above, with more rufous edges and inner wing-panels in fresh plumage (though these all fade gradually to buff); whitish above and below eyes more buff at first, but also bolder and extending to throat, giving more contrasting face pattern against darker cheek-crescents; quite different from adult female below, with rufous underbody and wing-linings (fading to whitish through first winter), all unstreaked except on chest, flanks and larger coverts; undersides of secondaries and greater coverts sometimes (often?) much darker than on adult female, increasing contrast with primaries and body. **Immature male** Juvenile remiges may not be moulted until long after body plumage turns mainly grey and white, and some retained well into second year; darker grey birds with browner markings near feather-tips above, more pronounced tail-bars, grey mottling on wing-linings and thin dark lines on secondaries are probably subadult.

**CONFUSION SPECIES** Harriers in general almost unmistakable as such – through combination of shape, flight, facial disc and, in many plumages (all in this case), white rump. In contrast to South America and much of Old World, this is the sole harrier species in Nearctic. (Only with possible vagrants in north Colombia or Venezuela would Cinereous [95] and Long-winged [105] need consideration.) Male distinguished by grey and white plumage from all sympatric raptors except, just possibly, White-tailed Kite [24] (no grey hood or white rump and, instead of black trailing edges, has black shoulders and carpal patches). But, when female or juvenile soaring or gliding far away and high up, wings raised in strong dihedral might cause confusion with Turkey Vulture [2] (much larger and darker, plain two-tone underwings, no white rump) or Swainson's Hawk [193] (has white rump, but reversed two-tone underwings, broader arms, more pointed tips, shorter tail). Some other buteos also soar with distinct but less strong dihedral (but in general are bulkier, with broader wings and shorter wider tail): worth taking into account are pale-morph Rough-legged [209] (dark carpal patches, white on base of tail rather than on coverts) and adult Red-shouldered [189] (similarly rufous, but no white rump and has crescentic primary-panels rather than dark secondaries). Female and juvenile might be confused with female Snail Kite [29] because of white tail-base and superficial similarities in head and body patterns (but thin long-hooked upper mandible, short squared tail, broad paddle-shaped wings held arched, not in V). Any vagrant reaching Eurasia (no record yet accepted) would need to be distinguished from Hen Harrier [93] (which see, but, in brief, adult male more uniformly paler grey and white with narrower, less solid, less blackish trailing wing-edges and subterminal and other tail-bars – all especially less obvious above, where central tail plain but for whitish tip, and trailing edges confined to inconspicuous spots near tips of secondaries – and, except sometimes in second year, far lesser tendency to rufous marks below; also six, rather than five, outermost primaries black; paler upperparts with much weaker trailing edges and less rufous underparts apply also to both females and juveniles, while females always and juveniles almost always have less contrasting face

pattern; juveniles seldom, if ever, so little streaked below). Vagrant juvenile in Old World would need distinction from still less streaked young of Montagu's and Pallid [98, 96].

**VOICE** Usually silent except in display and near nest, apart from occasional chattering when disturbed at winter roosts. Range of calls comparable to Hen Harrier [93]: fast cackling during sky-dance and other aerial displays; harsher yelping chatter, *kyeh-kyeh-kyeh...*, when intruder near nest; whistled squeal in various contexts, mainly from female; male calls female to food with soft chuckle.

**FOOD** Typically, small mammals (e.g. voles, cotton rats *Sigmodon*, ground squirrels *Spermophilus*), but males in particular also take many birds (passerines of open country, and young ducks, gamebirds, waders); sometimes amphibians (especially frogs), occasional reptiles, some insects (chiefly orthopterans). Reported to drown waterfowl. Foraging methods as for other harriers [e.g. 93, 95], but shown to locate concealed prey very efficiently by sound (see Rice).

**SOCIOSEXUAL BEHAVIOUR** Often solitary, even on migration (sometimes associating with groups of other raptors), but will congregate loosely at abundant food sources, while winter communal roosts (sometimes with Short-eared Owls *Asio flammeus*) commonly number 20, 50, even hundreds; sometimes loosely social nester, and males often polygynous, mating with up to three females. Aerial displays, often accompanied by calling, include single or mutual high-circling, stoops, chases, and mock-fights. Male's sky-dance spectacular and, as often arrives in breeding area 5–10 days before female, probably important in pair-formation: develops during pre-laying period from series of relatively shallow undulations to oft-repeated rollercoaster plunges down to mere 3–5 m above ground and steep climbs back up again to 30–40 m, variously with twists, rolls, spirals and loops, and much calling. Aerial food-passes or drops by male to female spectacular; when young in nest, female may dive-bomb inactive mate. Aerial battles not uncommon between first-year birds, less often between adults.

**BREEDING** April–August/September (laying dates varying by up to seven weeks between south and north). Nest is flimsy to substantial pad, heap or platform of grasses, reeds and other local materials, sometimes twigs, 30–80 cm across and 5–60 cm high, in thick vegetation by or on marshy ground or in emergent rushes or tall reeds in standing water. Clutch 4–6 (1–7). Incubation 29–31 days. Fledging 29–42 days, but young semi-nidicolous after second week; dependent for several further weeks.

**POPULATION** Vast breeding range extends over more than 12 million km<sup>2</sup>. Such an area, by extrapolation from local densities, and from figures for the comparable Hen Harrier [93] in Europe, might reasonably be expected to hold 50,000–60,000 pairs. Organochlorine pesticides contributed to serious decline in 1950s and 1960s; later bans produced some subsequent recovery, but marsh drainage and intensification of agriculture continue to be threats for a species more tied to wetlands for nesting than most of its congeners. Winter population of North America (south Canada and USA) was estimated at 110,000 individuals (including surviving juveniles) in 1986. Species is also 'common to frequent' passage

migrant and winter visitor in two-thirds of Mexico and mostly 'uncommon to frequent' through much of rest of Mexico to the Pacific slope of Nicaragua and Costa Rica; again by extrapolation, we can perhaps assume further wintering numbers of 10,000–20,000 in Central America. On all counts, however, early-spring total likely to be at lower end of six-figure range.

**GEOGRAPHICAL VARIATION** Monotypic. Often treated as race of Palearctic Hen Harrier [93], but adult is intermediate in various respects between that and Neotropical Cinereous Harrier [95] and juvenile significantly different from juvenile Hen: all three could be considered allopatric and distinct races of one species or, the course followed here, three species forming a superspecies.

**MEASUREMENTS** ♂ wing 328–352 mm, ♀ 335–405 mm; ♂ tail 193–238 mm, ♀ 210–258 mm; ♂ tarsus 71–80 mm, ♀ 80–89 mm. **Weights** ♂ 290–390 g, ♀ 390–600 g.

**REFERENCES** Armstrong (1983), Barnard (1982), Biaggi (1983), Bildstein (1978, 1979), Bildstein *et al.* (1984), Blake (1977), Clark (1972), Clark & Wheeler (1987), Craighead & Craighead (1956), Evans (1982), Fitzpatrick (1979), Hamerstrom (1963, 1968, 1969, 1986), Hamerstrom & Wilde (1973), Hecht (1951), Hilty & Brown (1986), Houston (1968), Howell & Webb (1995), Johnsgard (1990), Littlefield (1970), Palmer (1988), Pratt *et al.* (1987), Ridgely & Gwynne (1989), Root (1988), Russell (1991), Simmons (1989, 1991), Simmons *et al.* (1986, 1987), Slud (1964), Snyder & Snyder (1991), Stiles & Skutch (1989), Watson & Dickson (1972), Weller *et al.* (1955), Wheeler & Clark (1995), Yocum (1944).

## 95 CINEREOUS HARRIER

### *Circus cinereus* Vieillot, 1816

Plate 29

**DISTRIBUTION** Neotropical (5°N to 55°S); order 5; local through high Andes, more widespread in lower mountains and open lowlands of southern half of South America. Very patchily in Andes of Colombia (southwards from Cundinamarca and perhaps south Boyacá) and Ecuador; more continuously in Andes from Peru through Bolivia (La Paz, Oruro) to northwest Argentina (Jujuy, Salta, Tucumán); also coastal areas in Peru, and more extensively in lowlands from Bolivia (Cochabamba into Santa Cruz), Paraguay and southeastern Brazil (Santa Catarina, Rio Grande do Sul), through Uruguay, much of Argentina, and central and southern Chile (apparently only occasional visitor to northern third), down to Tierra del Fuego and Isla de los Estados [Staten Island], being commonest in Patagonia; also Falklands [Islas Malvinas], where now virtually extinct (see Population).

**MOVEMENTS** Largely sedentary or nomadic, but at least some northward migration from Patagonia during April–May, back in September–October, and probably partial migrant throughout lowland range in Argentina, Uruguay and extreme southeast Brazil; perhaps also altitudinal movement in Andes.

**HABITAT** Open country, particularly moorland, marshes, rushy hollows in grassland and scrub, pastures, and lowland reedbeds; in mountain puna zone from Colombia to northwest Argentina (perhaps commonest near vast lakes above 3,000 m), descending to upper regions of humid inter-Andean valleys in Ecuador, and lowlands farther south; also seen hunting or migrating over wheat-fields, other cultivated areas, forest clearings and dry Patagonian scrub. Sea-level to 4,500 m, but in Colombia not below 1,700 m (perhaps no longer below 2,200 m), in Ecuador mainly above 1,200 m, and in Patagonia largely below 2,000 m.

**FIELD CHARACTERS** Mid-sized harrier, adult male mostly grey and female brown, both barred rufous below, and typical of genus with facial ruff and small bill, but stockier than some, and with relatively shorter wings and legs, and longer tail, than allospecies [93, 94]. Perches openly, but mainly low down, on ground, mounds, fence posts, or bushes; wing-tips well short of tail-tip. Sexes dissimilar and female 0–25% larger; juvenile not unlike adult female, but more easily distinguished than juveniles of allospecies [93, 94]; much as adult after completion of first moult.

**PERCHED Adult male** Head, chest and upperparts mainly grey, slightly darker on back and wing-coverts, with still darker subterminal bands on secondaries and tail (also indistinct lateral tail-barring) and blackish primaries; lower breast, belly and thighs all white, boldly barred with rufous. **Adult female** Dark brown to dark chestnut-brown above, edged and spotted buff and grey-white, with grey-tinged and dark-banded flight-feathers and tail; white below, heavily brown-streaked on throat, brown-banded on chest, and otherwise rufous-banded like male (if rather more coarsely). **Juvenile** Much like adult female above, though blacker-brown, more uniform, and less grey-tinged on quills; rather different below, being



5

more cream-buff and mostly or entirely streaked, with dusky on throat and chest and rufous on abdomen and thighs (sometimes more spotted or barred rufous on belly). **Second-year male** Grey feathers start to appear on head and chest at about six months; once moult complete, much like adult male and difficult to distinguish, but browner-grey above, often odd brown feathers retained. **Bare parts** Adult eyes yellow, but younger females brown; juvenile brown of varying shades (cf. *allospecies* [93, 94]). Adult cere yellow or greenish-yellow, juvenile yellow-green. Adult legs orange-yellow, juvenile paler.

**FLIGHT** Medium-sized but slender raptor with longish wings (though, for harrier, these are relatively short, broad and round-tipped) and proportionally longer tail; white uppertail-coverts form conspicuous rump-patch in all plumages; wingspan 2.4 times total length. Flies with slow flexible beats, interspersed with glides on raised wings (said sometimes to glide on flat or even bowed wings like Hen Harrier [93], but this not personally confirmed); soars with wings in slighter dihedral, sometimes then looking rather *buteo*-like. **Adult male** Grey above, except for white rump, five black fingers, and indistinct subterminal tail-band and lateral tail-barring; below, mainly white wings contrast sharply with black primaries, blackish subterminal band along secondaries and rufous-banded body, also grey head and thinly dark-banded whitish tail. **Adult female** Dark brown above with white rump, and grey tinge both to broken-banded flight-feathers and to broad-banded tail; basically creamy-buff below, body and, more sparsely, wing-linings all barred brown to rufous, flight-feathers dark-banded and tail broadly banded (secondaries not darker than rest: cf. Northern Harrier [94]). **Juvenile** Resembles female, but darker-looking above with hardly any grey tinge to flight-feathers, and largely streaked dusky and rufous on more rufous-buff underbody and wing-linings; secondaries slightly darker than rest of wings. **Second-year male** Until quill moult complete, shows mixture of juvenile and adult flight- and tail-feathers.

**CONFUSION SPECIES** Special care needed in Colombia, where this species very local (mainly southern uplands) and where Northern Harrier [94] rare November-March visitor during northern winter (mainly western lowlands): compare the two species. Elsewhere, action and shape generally distinctive enough for ready separation from all except South America's only other harrier, Long-winged [103], which easily enough distinguished by its generally larger size (smallest males overlap slightly) and, more particularly, by its different jizz and lanky shape created by slighter build and clearly longer wings, though relatively shorter tail (often stated to be longer, but 50% overlap); adults also darker above, with more contrasting dark-banded grey flight-feathers and tail, white face pattern, grey cere, and, below, more uniformly light or dark wing-linings and body, either mainly white (apart from dark chest-band) or all blackish; dark-morph juvenile much more heavily streaked and rufous below than Cinereous and, though more similar, pale-morph juvenile still separable by face pattern, cleaner underbody, darker-streaked linings and, of course, jizz. Size and white rump can cause temporary confusion of female and juvenile Cinereous with ubiquitous Chimango Caracara [258], which shares much

of southern range (not Peru northwards). Misidentification of male as White-tailed Kite [24], or female or juvenile as *buteos*, likely to be only momentary.

**VOICE** Usually silent except in breeding area. Main call a rapid chattering *ker-ker-ker...* (male) or higher *kek-kek-kek...* (female), used in aerial displays and, as faster *kukikikik...* in defence of nest. Female also uses plaintive squealing whistle, *per-u* or *pre-pa*, in courtship.

**FOOD** Not studied like that of northern counterparts, but apparently mainly small mammals and birds, including downy young of various coots *Fulica* and waders; also reptiles (iguanas) and some insects and at least occasionally, perhaps regularly, frogs. In Tierra del Fuego mostly lizards and mammals, with very few birds. Forages by transects along habitat interfaces and by more haphazard quartering at 2-5 m above uniform low ground cover; male seen to chase passing birds from lookout perch, but this probably not genuine still-hunting. Most prey caught by quick pounce from foraging flight, but will chase and sometimes succeed in capturing small birds it flushes; also chases flightless young birds (and frogs?) on foot.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, but may roost communally and congregate at abundant food sources. Males sometimes polygynous. Solo and mutual high-circling common and both shallow and steep undulating sky-dances recorded; range of aerial displays perhaps comparable to those of well-studied northern counterparts [93, 94].

**BREEDING** Season apparently later and more precise than that of Long-winged Harrier [103] and most other South American raptors: said to nest October-January in south, but eggs seemingly never laid before mid November, even in northern Argentina, and young fledged before end January. Nest is heap of rushes, grass and other local vegetation 30-40 cm across and 10-30 cm deep, on more or less wet ground, sometimes in 40-60 cm of water (then on foundation of coot *Fulica* platform?), often at edge of bed of rushes up to 3 m high (sometimes several metres inside) or in damp grass and scrub. Clutch 3-4 (2-5?). Incubation c30 days. Fledging not recorded, but perhaps similar to that of northern counterparts.

**POPULATION** Breeding range extends over 5.4 million km<sup>2</sup> and, at densities of closely related Hen Harrier [93] in some European countries, this might represent 12,000-38,000 pairs. In much of its range, however, Cinereous is scarce and very local, being commoner only in Patagonia (especially Tierra del Fuego) and, possibly, parts of Peru; in northern two-thirds of Argentina, amounting to 35% of total range, it is greatly outnumbered at least 6:1 by Long-winged Harrier [103]. Thus, total population of birds (not pairs) in low tens of thousands seems highest possible figure. Virtual extinction in Falklands (Islas Malvinas), where sightings now rare and may no longer breed, probably due to destruction of natural grasslands and shooting. Drainage and pesticides could be problems, but in much of its range there is apparently more habitat available than individuals to take advantage of it. Proximity of breeding pairs of Long-winged Harriers within 100 m apparently presents no problem.

**GEOGRAPHICAL VARIATION** Usually treated as monotypic, but Falklands population (now apparently virtually extinct) has been distinguished as *C. t. histrionicus*. Obviously closely related to Northern Harrier [94] and Palearctic Hen Harrier [93], and sometimes considered possibly conspecific, but these three best regarded as allospecies forming a superspecies (see discussion under Hen Harrier and pp. 72–73).

**MEASUREMENTS** ♂ wing 297–345 mm, ♀ 345–371 mm;

♂ tail 204–253 mm, ♀ 230–282 mm; ♂♀ tarsus 66–76 mm. **Weights** No data, but probably comparable to allospecies [93, 94].

**REFERENCES** Amadon (1961a), Blake (1977), Cabot & Serrano (1988), Contreras *et al.* (1990), da la Peña (1992), Donazar *et al.* (1993a), Fjeldså & Krabbe (1990), Goodall *et al.* (1957), Hilty & Brown (1986), Humphrey *et al.* (1970), Iriarte *et al.* (1990), Jaksic & Jiménez (1986), Jiménez & Jaksic (1988), Johnson (1965), Sick (1993), Thiollay (1991a), Woods (1988).

## 96 PALLID HARRIER *Circus macrourus* (Gmelin, 1770)

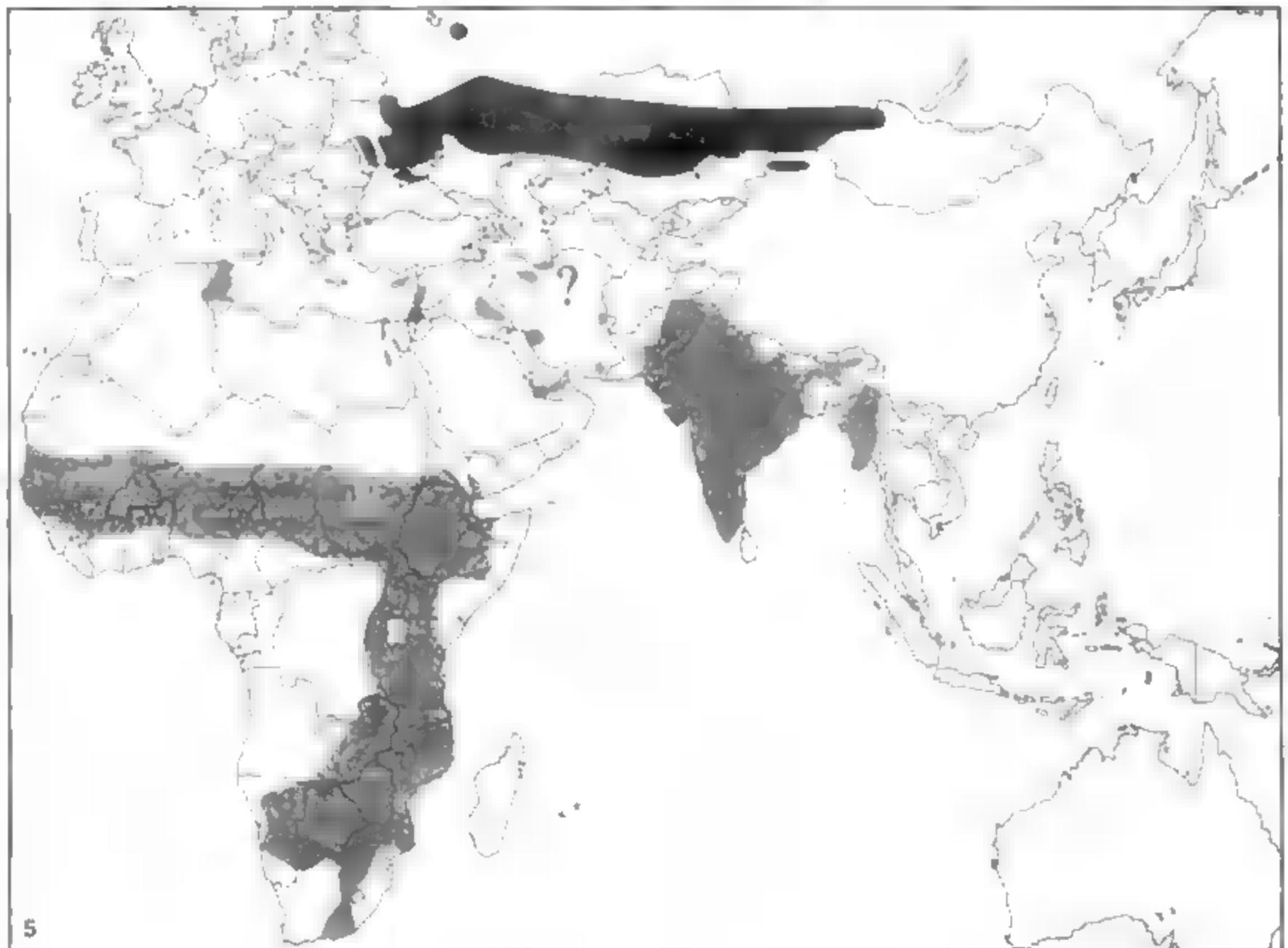
Plate 31

Other name: Pale Harrier

**DISTRIBUTION** Palearctic and, in winter, largely Afro-tropical and Indomalayan (56°N to 43°N, winter 41°N to 34°S); order 5; formerly common, even locally abundant, but considerable decrease since 1950s and now generally scarce to common with marked regional and annual fluctuations. Breeds eastern Europe and western and central Asia; now rare in Romania, Moldova, south Ukraine and south Belarus, with main range in southern Russia and Kazakhstan north to southern Siberia, east to Alma Ata, Tuva, west China (west Sinkiang) and supposedly northwest Mongolia; formerly south to Bulgaria, east Romania, southeast Caucasus and perhaps north Iran; has nested west to south Sweden and Germany (notably in irruption year of 1952), possibly

also Czech Republic, Slovakia, Austria and Hungary; male bred with female Montagu's [98] in Finland in 1993, and with female Hen [93] in Scotland in 1995.

**MOVEMENTS** Almost entirely migratory, wintering chiefly in sub-Saharan Africa and southern Asia, occasionally north to southern limits of breeding range: in Africa, from Senegambia across to Ethiopia south to northeast Namibia and eastern South Africa, but mainly north of equator (in East Africa locally numerous to 6°S); in southern Asia, most numerous in Indian subcontinent west to southern Afghanistan and Pakistan, north to Nepal, east to Assam and Burma, and south to Maldives, Sri Lanka and Andamans; some also winter Tunisia, Egypt, south Balkans, southwest Turkey, Middle East, Arabia south to Yemen and Oman, southern



Caspian area (more irregularly north to Crimea, Caucasus and Aral) and southeast China. Movements, in West Palearctic southward September–October (mid August–early November) and return mid March–mid April (March–early May), more or less on broad fronts with only small concentrations at migration sites in, for example, northeast Turkey and Israel and, in spring only, Tunisia: in autumn, West Africa apparently reached by diagonal flight across Sahara, but in spring some at least take more direct route across Mediterranean through Algeria, Tunisia and Libya, while 35 crossing Italy's Straits of Messina late February–late May 1997 is largest movement recorded in Europe; Tunisian-ringed recoveries at up to 5,000 km in Kazakhstan and Russia (one 3,300 km in 24 days). Vagrants north to Britain, Netherlands and Fennoscandia, west to Spain and Morocco, east to Transbaikalia.

**HABITAT** Most characteristically, steppe and dry grassland, even semi-desert, in open rolling country and upland plateaux, but ploughing, overgrazing and other development of former breeding areas, especially in eastern Europe, has resulted in more nesting in forest clearings, clear-felled forest-steppe and, especially, wetland edges; north of the main Palearctic range, a few breed in taiga and forest tundra. Typically also winters in open grassland, savannah and semi-desert, but seen hunting over young corn, open woodland, wetland margins, even rice paddies. Breeds sea-level to 1,200 m, but winters to 3,000 m in Himalayas and 4,000 m in Africa.

**FIELD CHARACTERS** Small to medium-sized slim harrier, male pale grey and white with black wedges at wing-tips, other plumages white-rumped and having facial disc, and all with longish wings, tail and legs. Perches on ground, posts, small bushes and other low vantage points, seldom on trees; wing-tips reach well down tail, but 2–5 cm short of tip (cf. Montagu's [98]). Sexes dissimilar, and females usually obviously larger, averaging around 11% bigger (up to 27%) and about 46% heavier; juvenile easily distinguished, but much like respective adult after first moult, if not fully so until after second.

**PERCHED Adult male** All grey to pale silvery-grey above (some looking almost white in sunlight, but other individuals hardly paler than Hen Harrier [93]), with white forehead, lores and sides of head, apart from black of longest primaries; largely white below and, at most, faintly washed whitish-grey on throat. **Adult female** Very similar in general pattern to adult females of Hen and Montagu's [98], and any slight differences in body plumage and wing-coverts unreliable because of effects of abrasion, moult and even individual variation; but generally has sharper face pattern than either, with clearer eye-lines and cheek-crescents additionally emphasised by streaky collar extending on to throat, almost no dark barring showing through on secondaries, and chest more strongly streaked than abdomen (more demarcated than more evenly streaked Montagu's, no flank and thigh blotches like Hen). **Juvenile** Quite distinct from adult female (and from juvenile Hen, but very similar to juvenile Montagu's): distinctly darker brown above than adult female, and more broadly tipped and edged rufous; face pattern comparable, but eye-lines and cheek-crescents even more solidly dark (latter sharply emphasised by clear creamy collar) and joining more solidly at front over dark lores; whole underbody plain rufous-brown to rufous-buff (indi-

vidually variable) with virtually no dark streaks on chest-sides. **First-year male** Generally little head and other moult in first winter, so usually remains in worn and faded juvenile plumage until well into first summer (by which time immature male Montagu's with otherwise now similar head pattern will be showing mix of grey body and covert feathers (see 'Flight')). **Second-year male** After first complete moult, much like adult male but some brownish to buffish tinges on head, upperparts and throat, and often hint of dark subterminal tail-band (again, see 'Flight'). **First/second-year female** In first spring, very worn and much as male of same age (unless latter already yellow-eyed); from late first summer, following complete moult, like adult female but general plumage darker, head pattern more contrasty (juvenile-like) and iris normally still brown. **Bare parts** Adult eyes yellow; juvenile grey with brown ring, later yellow (male earlier than female). Cere and legs yellow.

**FLIGHT** Smallish to medium-sized and noticeably slim raptor with longish wings and tail, among other harrier characteristics; wings made to look longer by being narrower than most congeners; shape very like Montagu's [98], but RSD greater, similarly rounded tail proportionately slightly longer, body not quite so slender; hand pointed, with p8/7 clearly longer than p9/6 (only four clear fingers when spread); wingspan 2.5 times total length. Small adult or juvenile male has especially light, buoyant and graceful flight, body rising and falling tern-like, but larger female has slightly more solid and powerful action: several leisurely flaps and then short wavering glide low over ground on V wings; soars with wings similarly raised. **Adult male** Pale to palest grey above, whiter on head, with contrasting black wedge on wing-tips formed by four longest primaries (p5–p9) and only partly dusky tips on next two (p1, p10); grey barring on uppertail-coverts leaves no impression of white rump; lateral tail-feathers white with clear grey barring; this barring and grey wash on throat barely discernible below, so looks all white apart from black-wedged wing-tips. **Adult female** White-rumped, ring-tailed and, apart from proportions and especially wing shape, generally similar in pattern to adult female Hen Harrier [93]; very close in wing shape and flight action as well to adult female Montagu's; best distinguished by combination of face pattern (see 'Perched' and plate 31), upperside of secondaries (uniform brown, no dark barring as generally visible on Montagu's), undersides of both primaries (diffusely and unevenly barred) and secondaries (dark and pale bands roughly equal in width, and whole secondaries showing darker than primaries), and streaking on underbody concentrated on breast (see 'Perched'). But many of these points apply only when comparing adult female with adult female, and correct ageing is necessary first step; experience is also needed and conditions must be good. **Juvenile** White-rumped and ring-tailed like adult female, but upperside clearly darker, underbody and wing-linings almost plain rufous-brown to rufous-buff and underside of secondaries almost uniformly dark, so distinct from all plumages of Hen Harrier, but extremely similar to juvenile Montagu's; best distinguished by face pattern (sharply defined cheek-crescents extending forward to dark lores, emphasised by clearly defined whitish collar), also by plain bases (with contrastingly darker-looking primary

coverts) to otherwise more evenly barred primaries below, lack of streaks on sides of chest and flanks, and paler lateral tail-feathers almost uniformly buff below. **Immature male** See comments on moult and face pattern in 'Perched'; worn juvenile outer primaries and inner secondaries may remain in second autumn, at which stage new dark grey feathers on upperparts and partially moulted streaky-looking breast can give impression at distance of Montagu's or even dark-hooded look of Hen Harrier; at end of second summer, most differ from adult male only in duller, browner-grey upperparts, less clean-looking head and throat (some brownish to rufous-buff markings), larger dark area at wing-tips and faint subterminal tail-band. **Immature female** See 'Perched'; bright yellow eyes of adult not acquired before third spring

**CONFUSION SPECIES** Pale grey and white adult male with black wedges on wing-tips usually almost unmistakable, but at distance consider male Montagu's Harrier [98] (darker grey above and to chest, streaked abdomen, extensively black-tipped wings, black bar on secondaries above and two below); male Hen Harrier [93] (mainly Palearctic, not necessarily darker above but grey-hooded to chest, white rump, extensively black-tipped wings, dark trailing edges below); and even adult Black-shouldered Kite [25] (similarly glides and soars on raised wings – though hands more level – and largely white below except for much more extensive black wing-tips, but smaller, shorter-tailed, with black forewings above, and often hovers persistently). All plumages of Pallid can, with experience and practice, be fairly easily distinguished by shape and wing action from Hen Harrier (bulkier, with broader, more rounded wings, less buoyant flight), and adult female and immatures by range of more or less subtle differences, of which those of face pattern, head streaking and outline of facial disc (see foot of plate 31), and form of barring on underside of primaries, are the most useful (compare Field Characters sections). But separation of females and immatures from Montagu's much more difficult; again, face pattern and strength of outline of disc particularly useful (see also foot of plate 31), but there is some individual geographical variation and overlap, so important to look at patterns of underwings and axillaries, streaking on underbody, and tail-barring (compare Field Characters sections). Before looking at these features, however, essential to determine bird's age: adult females, and juveniles only few months old (unstreaked below), are not difficult to assess, but contour-feathers (and sometimes tail) may or may not begin to moult in first winter, and much geographical variation during completion of moult in June–September (see first-summer females and males) and still some differences retained after that (see second-years). Additional slight differences in build and wing shape, wing/tail proportions (wing-tips actually reach tail-tip on perched Montagu's, unless in moult), length of legs (Montagu's shorter), and form of any markings on white rump (more streaked on Montagu's, more barred on Pallid) are subsidiary points to be used by experienced observers clinching identifications made on other features.

**VOICE** Usually silent away from breeding area, where vocabulary probably comparable to Hen Harrier [93]. Main calls based on rapid high-pitched chattering *kik-*

*ik-ik-ik-k...*, opening syllables more drawn out when female responding to human intruder. Female also reported to use quite different *gigigig kirrrrk gigigig kirrrrk...* against nest-predator. Food-call of female tremulous whistled *piir piir...*

**FOOD** In summer, chiefly small mammals (especially voles, mice, steppe lemmings *Lagurus*, shrews, also ground squirrels *Spermophilus* and hamsters *Cricetus*) and, when variable populations of these are low, sometimes many mainly small birds (adult and, especially, juvenile larks, pipits *Anthus*, wagtails *Motacilla* and wheatears *Oenanthe*, and young gamebirds, but female can kill to size of adult grouse and duck); often also large insects (grasshoppers, beetles, dragonflies), occasionally lizards and birds' eggs. In African winter quarters, birds often as important as small mammals, and many more lizards and orthopterans taken. Forages like other harriers [see 93] by low flaps-with-glides, usually at heights of 1–9 m, but, unexpectedly, prefers to force bird prey to climb enough to be caught in flight (Day-gora). Breeding numbers much dependent on small-mammal populations and, when these low, may erupt beyond normal range. In winter quarters, much attracted to grass fires and locust swarms.

**SOCIOSEXUAL BEHAVIOUR** Often solitary, but in winter congregates loosely where food abundant, roosts communally in groups of up to 20–30 – occasionally in much larger numbers with other harriers (see Montagu's [98]) – and females and juveniles in particular sometimes migrate in parties of up to 10–15 in autumn. Usually solitary nester, but loosely social when prey populations high, and, unlike most other harriers, polygyny apparently unknown and arrives paired on breeding grounds. In this connection, it seems significant that high-circling, both single and multiple, and male diving at female regularly take place in winter quarters as well as over nesting areas. Male's sky-dance includes plunges and climbs, somersaults and rolls, probably much like other harriers. Aerial food-passes also similar. Display-flights by first-year birds recorded.

**BREEDING** May–July (end April–early August). Nest varies from lined scrape to small heap of local vegetation up to 50 cm across and 20 cm high, typically in tall grass, low scrub or dry reeds, sometimes on mound; much less often, but in some areas now increasingly (see Habitat), in wetter areas. Clutch 4–5 (3–6). Incubation 29–30 days (up to 40 for whole clutch). Fledging 32–45 days, but young start to move from nest after second week; independent after further 2–3 weeks.

**POPULATION** If densities of 2.2–6.2 pairs/100 km<sup>2</sup> recorded in steppe on Asiatic side of southern Urals applied evenly over whole breeding range of 4–4.5 million km<sup>2</sup>, as many as 88,000–279,000 pairs might be suggested. But much lower densities elsewhere (e.g. in suitable habitat in Ukraine only c1–2 pairs/300 km<sup>2</sup>) and comparisons with other Palearctic open-country harriers would indicate 15,000–35,000 pairs to be more likely. Indeed, early-1990s population was put at no higher than 20,000 pairs, of which only 2,000 in Europe and almost all of those in Russia (apart from no more than five pairs each in Belarus and Moldova, perhaps similar number in Romania and 10–17 pairs in Ukraine). All these figures represent marked declines since 1950s,

most serious in Europe but also in Asiatic Russia and Kazakhstan, which now hold bulk of population: in Kazakhstan has become generally scarcer than Montagu's [98]. Ringing recoveries show that at least some birds from about 75°E winter in Africa, and declines in, especially, Europe and Kazakhstan are reflected there: until 1960s, Pallid was much more numerous than Montagu's in Africa and often commonest harrier in savannahs and lowland plains; now, for most part, positions reversed. Decreases attributed to habitat loss and dwindling numbers of small rodents and terrestrial passerines brought about by ploughing of virgin steppe, greatly increased grazing by cattle in damp hollows and along riversides, excessive use of pesticides and other aspects of greatly intensified cultivation. Some have had to adapt to marshes and other wetlands.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 310–356 mm, ♀ 343–393 mm; ♂ tail 197–232 mm, ♀ 215–255 mm; ♂ tarsus 61–78 mm,

♀ 63–78 mm. **Weights** ♂ 233–416 g, ♀ 402–550 g.

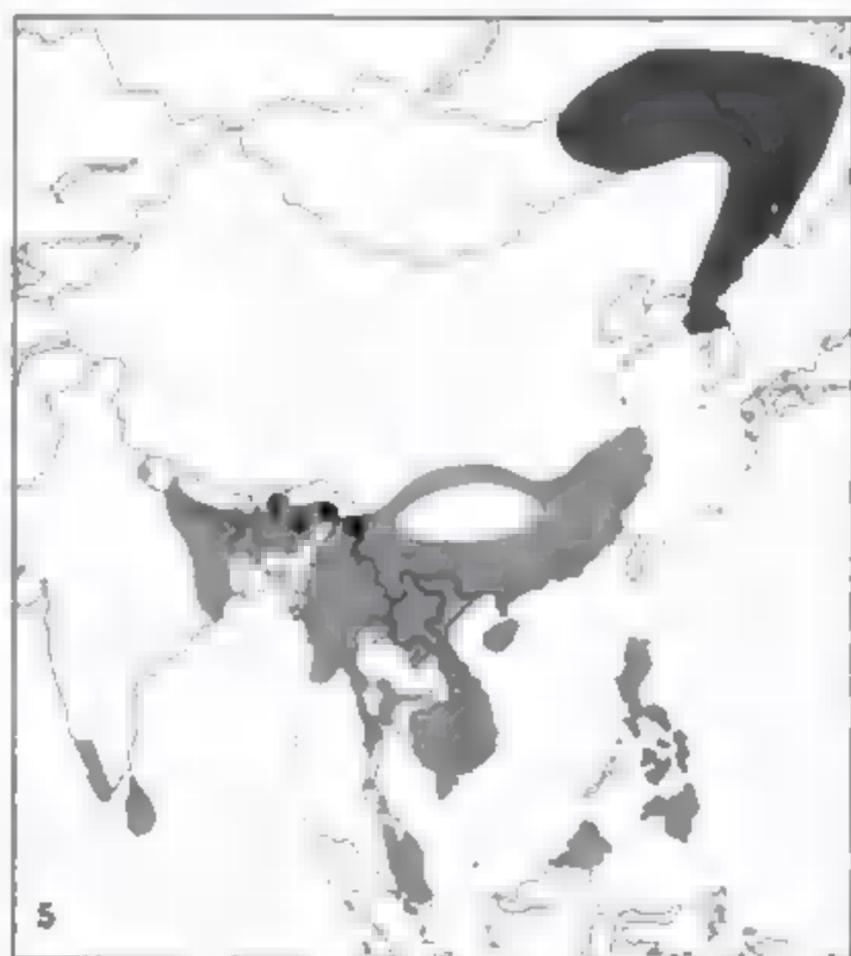
**REFERENCES** Ali & Ripley (1978), Arnould & Lachaux (1974), Barnes (2000), Beaman & Madge (1998), BirdLife International (2000), Brown *et al.* (1982), Cheng Tso-hsin (1987), Clarke (1993), Clark (1997), Clark & Schmitt (1999), Cramp & Simmons (1980), Davygora (1985), Davygora & Belik (1994), Delin & Svensson (1988), Dementiev & Gladkov (1951), Etchécopar & Hûe (1978), Flou *et al.* (1984), Foutsman (1993, 1995, 1999), Frank (1951), Gendrol (1986, 1995), Ginn *et al.* (1989), Glutz von Blotzheim *et al.* (1971), Gimes (1987), Grimmett *et al.* (1988), Hagemeijer & Blair (1997), Handrinos & Akronis (1997), Handrinos & Demopoulos (1983), Harris *et al.* (1989), Hollom *et al.* (1988), Kemp & Kemp (1988), Knystautas (1993), Kuznetsov (1994), Lontkowski (1993), Lontkowski & Skakuj (1995), Lundevall & Rosenberg (1955), Meyer de Schauensee (1984), Pickford *et al.* (1989), Piechocki (1995a), Porter *et al.* (1981, 1996), Richardson (1990), Roberts (1991), Rogacheva (1992), Shirihai (1996), Shirihai & Christie (1992), Shirihai *et al.* (1996), Smythies (1986), Steyn (1982), Svensson (1971), Thiollay (1989c), Uentdörfer (1939, 1952), Zimmerman *et al.* (1996).

## 97 PIED HARRIER *Circus melanoleucus* (Pennant, 1769)

Plate 33

**DISTRIBUTION** Basically eastern Palearctic (54°N to 40°N) in northern summer, and Indomalayan (28°N to 1°N) in winter, but nesting also recorded in latter region; order 5; rather limited range, but still locally common even if decreasing. Eastern Asia: breeds southeast Siberia (Transbaikalia through Amur and Ussuri river valleys), northeast Mongolia, north China (northern Inner Mongolia, Heilongjiang, Jilin, Liaoning) and North Korea; few also nest, or at least have nested, in northeast India (Assam) and north Burma, but almost certainly not, as suggested, in Philippines.

**MOVEMENTS** Almost entirely migratory (ignoring any which may breed or have bred within winter range),



moving south in August–December (mainly September–October) and north again in March–May, but in years of high vole populations some may stay on in south Ussuriland and northeast China. Winters southeast Asia: southeast China (south of Chang Jiang valley), Burma, Thailand and Indochinese countries south into peninsular Malaysia, and from Philippines through Sulu Archipelago into north Borneo (locally common down to east Sarawak and north Kalimantan), as well as southward through Bangladesh, Nepal (uncommon) and eastern and southern India (common as far as Orissa, sparingly down to Tamil Nadu and Kerala, vagrant north to Uttar Pradesh and west to Bombay) and Sri Lanka (few). Southward migration evidently funnelled down mainland Chinese coast: over 14,500 counted passing over Beidaihehaibin, northeast Hebei, in autumn 1986. Irregular south Korea and Taiwan (where occasionally winters), and only vagrant to Japan (islands in Korea Strait and Sea of Japan, also eastern Honshu).

**HABITAT** More or less open country, ranging from dry steppe or lush grassland to boggy birch scrub, but clear preference for such wetlands as lake edges, riverside meadows, and marshes with rushes or reeds. In winter, grassland or cultivation to open hills, but especially rice paddies, swamps, reedbeds. Sea-level to 2,100 m, but breeding mainly below 1,500 m. Male at 3,800– m in Nepal in March presumably on passage.

**FIELD CHARACTERS** Mid-sized harrier, size and shape of Hen [93] but adult male strikingly pied, with typically long wings, tail and legs, but rather obscure facial ruff. Perches on reeds, posts, mounds or ground, not normally on trees; wing-tips reach well down tail, but clearly short of tip. Sexes dissimilar, but female averages only 4% larger (up to 13%) and perhaps around 8% heavier; juvenile also dissimilar, but much like respective adult after first moult completed.

**PERCHED Adult male** Distinctive and strongly contrasted:

all-black head to chest, upperbody, median wing-coverts and primaries; white-edged greyish lesser coverts, thinly grey-barréd white rump, and white abdomen and thighs; otherwise pale silvery-grey wings and tail. **Adult female** Dark brown above, streaked cream to rusty-white on face, head and neck, as well as on lesser wing-coverts, but back and median coverts much plainer, and greater coverts and secondaries brownish-grey with dusky subterminal bars and some rufous edges; uppertail-coverts white with variable brown barring, and tail brownish-grey with dusky subterminal and four other bars; cream to rusty-white below with dark brown to red-brown streaks from throat to upper abdomen, fading out to light rufous streaks or almost plain on lower belly, thighs and crissum. **Juvenile** All dark brown above, obscurely edged cinnamon to rufous, apart from some whitish streaks on head and nape, and buff to whitish uppertail-coverts; greater wing-coverts and flight-feathers look plain dark brown, and strong dusky bars on tail visible only at close range; underbody all dark cinnamon-rufous with variable but inconspicuous dusky and buff streaks, looking rather uniform at distance. **Bare parts** Adult male eyes yellow; female brown, becoming yellower when older; juvenile brown (or male yellow-brown?). Cere variously yellow, or greenish- or greyish-yellow (but connection with age unclear). Adult male legs orange-yellow, female paler yellow, juvenile dull yellow.

**FLIGHT** Medium-sized raptor with usual harrier characters, closest in size and shape to Hen Harrier [93], including similar longish and fairly narrow wings slightly rounded at tips, and long rounded tail; wingspan 2.5 times total length. Typical buoyant action of few leisurely beats interspersed with glides; glides and soars with wings in shallow V. **Adult male** Above, black head, back, median wing-coverts and primaries contrast with more or less white shoulders and rump, and otherwise grey mid-wings and tail; below, all white but for black head to chest, black bands and grey-white tail. **Adult female** Dark brown upperbody and inner wings, somewhat pale-streaked on head (with some white around dark eye-stripes like other smaller harriers), but whitish-buff shoulders and strong greyish cast to rest of wings and tail, which also respectively blackish-barréd and brown-banded; usually obvious white or whitish rump; below, streaky throat and chest with more or less rufous tone, but rest of underbody and wings look relatively whitish, though abdomen tinged rusty-white to cream, wing-linings somewhat barréd and quills dusky-barréd (broadest subterminally on tail and secondaries, while primaries dark-tipped). **Juvenile** More uniformly dark brown above, tinged rufous on body and wing-coverts, with obscure barring on tail, but again some white around dark eye-stripes, often whitish patch on nape and always conspicuous, if narrow, creamy band across rump; underbody and wing-linings distinctively cinnamon-chestnut with inconspicuous pale streaking (looking uniform at distance); undersides of secondaries may appear almost uniformly dark grey or more whitish and strongly dark-barréd like tail, while primaries more lightly barréd or almost plain creamy at bases.

**CONFUSION SPECIES** Adult male almost unmistakable, though male of eastern race of Northern Marsh Harrier [100] has comparable three-toned pattern (but streaked head to chest, blackish subterminal lines along

tips of greater wing-coverts, secondaries and tail, and no white on shoulders). See also Black-shouldered Kite [25] and Black Baza [13]. Other plumages need more care in distinction from females and/or immatures of Northern Marsh (larger, bulkier, broader-winged). Hen [93] (very similar in size and shape) and, during northern winter especially in India, Nepal and Burma, Pallid [96] and Montagu's [98] (both slimmer, with thinner and more pointed wings). Strong possibility of confusion between female Pied and subadult male Northern Marsh of eastern race, which has comparable summer and winter ranges and similar pattern, including white rump and shoulders, and greyish primary coverts, flight-feathers and tail; on Northern Marsh, grey areas usually less brown, and streaking below less rufous and less extensive, but, apart from differences in size, wing breadth and action (which become clear with experience), best distinctions, again comparative, are less complete and narrower barring on flight-feathers and tail. (Northern Marsh is much the commoner and, if your bird might be that species, it probably is.) Female Pied is very similar in size and shape to female and juvenile Hen (but those lack grey tones above, are less white and more heavily streaked below, and more broadly barréd on tail and underside of flight-feathers, as well as having more defined facial disc). Juvenile Pied needs distinction from dark juvenile of eastern race of Northern Marsh (apart from larger size and bulkier shape, less obvious white on rump, no dark eye-stripes highlighted by white surrounds, less bold barring on tail, slight differences in underwing pattern). Juvenile Pallid and Montagu's have clearly paler rufous-buff underparts. See also Black Kite [39] and juvenile Brahminy Kite [41].

**VOICE** Usually silent except in display and near nest, apart from occasional quiet *wek-wek-wek* of anxiety. In display, male repeatedly calls *kiiy-veeee* (resembling Northern Lapwing *Vanellus vanellus*) and female rapid *ke-ke-ke*. Disturbed at nest with young, female has rapid chattering *chak-chak-chak-chak-chak-chak* reminiscent of Black-billed Magpie *Pica pica*.

**FOOD** Evidently varies seasonally, regionally and individually, but recorded prey includes, roughly in descending order of significance: small mammals (especially voles), frogs, large insects (e.g. grasshoppers, beetles), nestlings, lizards, small or wounded birds (mostly passerines), snakes, fish and, once, carrion. Foraging methods like those of other harriers [cf. 91, 93, 98, etc].

**SOCIOSEXUAL BEHAVIOUR** Solitary, to loosely gregarious at roosts (often with other species of harrier) or in rich feeding areas and on migration. Like other harriers, aerial displays, mainly early in nesting cycle, include single and mutual high-circling, male diving at female, and variously undulating or rollercoaster sky-dances, also food-passes; male noisy in courtship flights (see Voice).

**BREEDING** Mid May–August (probably from April in Assam or Burma). Flattened pad of grass, reeds and other local vegetation, 40–50 cm across, on dry or, more usually, wet or boggy ground among reeds, rushes, long grass or low scrub. Clutch 4–5 (3–6). Incubation 30+ days. Fledging at least 1 month, but young ridiculous when half-grown.

**POPULATION** Limits of breeding range enclose some 1.2–1.6 million km<sup>2</sup>. Nests have been found as little as 1 km apart in optimum habitat but, by comparison with densities of other harriers, of which Montagu's [98] is probably the closest ecologically, 5,000–10,000 pairs might be expected over such an area. Assumption of five-figure population is borne out by the total of over 14,500 migrants funnelled past one coastal site in China in autumn 1986 (see Movements), though that figure would include many juveniles. Again like other harriers, this species is thought to be decreasing as result of drainage and developing agriculture.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 344–367 mm, ♀ 355–387 mm; ♂ tail 197–217 mm, ♀ 211–240 mm; ♂ tarsus 76–80 mm, ♀ 81–88 mm. **Weights** ♂ 254–325 g, ♀ 390 [?]–455 g.

**REFERENCES** Austin (1948), Brazil (1991), Brazil & Hatawa (1991), Cheng Tso-lsin (1987), Dementiev & Gladkov (1951), Dickinson (1986), Dickinson *et al.* (1991), Echeúpar & Flúe (1978), Flint *et al.* (1984), Gore & Wou (1971), Henry (1998), Inskipp & Inskipp (1991), King *et al.* (1975), Kuvstantas (1993), Lekagul & Round (1991), Long Gaozhen (1982), MacKinnon & Phillipps (1993), Medway & Wells (1976), Meyer de Schauensee (1984), Neufeldt (1964), Smythies (1981, 1986), Stanford (1937).

## 98 MONTAGU'S HARRIER *Circus pygargus* (Linnaeus, 1758)

Plate 31

**DISTRIBUTION** Palearctic and, in winter, virtually entirely Afrotropical and Indomalayan (61°N to 33°N, winter 34°N to 34°S); order 6; widespread but decreasing and, where formerly locally abundant, now only locally common. Breeds Europe and western and central Asia, with summer and winter distributions comparable to Pallid Harrier [96] except that breeding range extends much farther west and slightly farther north and south; breeds locally northwest Africa and most European countries north to south Sweden and south Finland, but rare Britain, Fennoscandia and central Europe, irregular Balkans; common only Iberia, France, Poland, Belarus, east Ukraine, southern Russia north to southern

Siberia, and Kazakhstan east to Tiva and northwest Mongolia, south through Kirgizstan to Tadzhikistan; also Turkey, southern Caucasus and northwest Iran.

**MOVEMENTS** Entirely migratory, wintering chiefly in sub-Saharan Africa (west to Senegambia and south to northeast Namibia and eastern Cape Province, where now less common) and the Indian subcontinent and adjacent southern Asia (from southeastern Iran through Pakistan and all India, north to Nepal, east to Assam and probably western Burma, and south to Laccadives, Maldives, Sri Lanka and Andamans); some also winter Yemen and Oman and very rarely north to England, Belgium and Germany. Southward movements mid



August–mid September (end July–early November) and northward return mid March–late April (March–early May), more or less on broad fronts, but with concentrations at Gibraltar (over 1,700 in two autumn months of 1972) and down Rift Valley; present southern Africa October–April. Some (many?) immatures overwinter in winter quarters. Vagrants have reached north to Iceland and Norway, and west to Madeira and Canaries.

**HABITAT** Breeds in wide range of open lowlands – dry or wet, natural or cultivated – including rank grassland, cornfields, reedbeds and other marshland, heaths, moors, young conifer plantations and other low scrub, hunting over still more open country with sparse ground vegetation. Winters in open grassland and cultivation from lowlands to upland plateaux, also in ricefields in West Africa and at marshland edges in Indian subcontinent; less in semi-desert than Pallid Harrier [96]. Breeds sea-level to 1,500+ m, but mainly below 750 m; winters frequently to 2,500 m, even 3,000 m in Himalayas and 4,000 m in Africa.

**FIELD CHARACTERS** Slender mid-sized harrier (both sexes similar in size to female Pallid [96]), male usually dark grey and rufous-streaked white with black wing-tips, other plumages white-rumped and with clearer facial disc, and all with longish wings, tail and legs. Perches mostly on ground, posts and other low vantage points, only occasionally on trees; wing-tips almost or actually reach tail-tip (cf. Pallid). Dimorphic (dark morph rare, perhaps most frequent in Iberia). Sexes dissimilar, but female not obviously larger (mean only 1%) despite averaging around 30% heavier; juvenile easily distinguished, but much like respective adult after first moult, if not fully so until after second.

**PERCHED Normal adult male** Head to breast and whole upperparts mainly dusky grey, darkest on crown, back and secondary coverts (which may all be tinged brown in worn plumage) and slightly paler on face to breast; primary coverts, secondaries and tail clearly lighter grey with contrasting black bar (partly hidden at rest) on secondaries, and black primaries (grey-tipped in fresh plumage); abdomen and thighs more or less white with rufous streaks. **Dark-morph adult male** All blackish, more or less tinged grey above and brown below, blackest on head and greyest on tail. **Normal adult female** Very similar in general pattern to adult females of Hen [95] and Pallid [96], and any slight differences in body plumage and wing-coverts unreliable because of effects of abrasion, moult and even individual variation; but generally has more white around eyes (especially stronger supercilia) than either (and made more obvious than Pallid's because of fainter black eye-lines), more sharply defined dark cheek-crescents than Hen (not extending forward solidly to bill as on Pallid), much less clear collar than Pallid (not extending across throat), dark barring showing through on secondaries (less on Hen, hardly at all on Pallid), and more evenly streaked underparts (not obviously stronger on chest like Pallid, not flank and thigh blotches like Hen). **Dark-morph adult female and juvenile** All dark chocolate-brown, apart from barred tail like normal morph. **Normal juvenile** Quite distinct from adult female (and from juvenile Hen, but very similar to juvenile Pallid): distinctly darker brown above than adult female, and more broadly tipped and edged rufous; face pattern comparable, with much white

around eyes, but cheek-crescent darker and sharper (still no clear collar); whole underbody plain rufous-brown to rufous-buff (individually variable) apart from, often but not always, few dark streaks at sides of chest. **First-year male** After partial and very variable moult, especially of head region, in winter quarters, new brownish-grey feathers can result in face pattern not unlike ringtail Pallid, even to extent of more prominent collar behind isolated cheek-crescent, but chest begins to turn darkish grey at same time; plumage increasingly becomes mixture during first summer (see 'Flight'). **Second-year male** After first complete moult, much like adult male but some brownish tinge to head and nape, less extensive grey on breast (again, see 'Flight'). **First/second-year female** Variable: some virtually identical to juvenile, while others very like adult female, but eyes darker (see also 'Flight'). **Bare parts** Adult eyes yellow; juvenile male probably dark grey, juvenile female brown; first-summer/second-year immatures becoming yellow with brown spots. Cere and legs yellow.

**FLIGHT** Smallish to mid-sized and particularly slender raptor with longish wings and tail among other harrier characteristics; shape very like female Pallid [96], but RSD much less, body slither, wings marginally longer in proportion, tail similarly rounded; hand pointed, with p8 longest and p9/7 obviously longer than p10/8 (only four clear fingers when spread); wingspan 2.6 times total length. Flight more buoyant and less powerful-looking than female Pallid, if not so light as male, with body similarly rising and falling tern-like; several leisurely flaps and then short wavering glide low over ground on V wings; occasionally hovers; soars with wings raised. **Normal adult male** Mainly dark grey above, lighter grey on primary coverts, innermost primaries, outer secondaries, rump and tail, but all outer primaries (p5–10, and most of p4) form solid black wing-tip which almost linked to body by black band across base of secondaries; when tail spread, brownish to rufous-brown bars show at sides and these slightly more obvious from below; otherwise, throat to breast darkish grey, merging into rufous-streaked white abdomen and crissum; underwings basically white with even more extensive black wing-tips (p3–10 look dark), two black bands showing on secondaries as well as variably conspicuous dark trailing edges; underwing-coverts sometimes plain white, but usually streaked rufous on greater, and sometimes on medians, while primaries barred or spotted dusky. **Dark-morph adult male** Looks uniformly dark at any distance, apart from paler greyish tail (which may show subterminal and two other darker bars underneath) and variable greyish tinge to primary-coverts above. **Normal adult female** White-rumped, ring-tailed and, apart from proportions and especially wing shape, generally similar in pattern to adult female Hen Harrier [95]; more confusingly, very close in wing shape and flight action as well to adult female Pallid: best distinguished by combination of face pattern (see 'Perched' and plate 31), upperside of secondaries (dark barring generally much more visible than on Pallid), undersides of both primaries (evenly spaced barring, dark trailing edges) and secondaries (central dark band equal to or broader than rearmost, subterminal pale band broader than both trailing dark band and inner pale band, and whole secondaries not much darker than primaries), more even streaking on underbody (see 'Perched'). But many

of these points apply only when comparing adult female with adult female, and correct ageing is necessary first step; experience is also needed and conditions must be good. **Dark-morph adult female and juvenile** Above, dark chocolate-brown with barred tail like normal morph (but no white rump); similar below except for whitish area (which varies in size and may be barred, mottled or plain, perhaps according to age) across bases of primaries, while primary coverts may be greyer and obscure barring show on slightly paler secondaries. **Normal juvenile** White-rumped and ring-tailed like normal adult female, but upperside clearly darker, underbody and wing-linings almost plain rufous-brown to rufous-buff and underside of secondaries almost uniformly dark, so distinct from all plumages of Hen Harrier, but extremely similar to juvenile Pallid: best distinguished by face pattern (almost as strong as Pallid, with broader supercilia and more white around eyes, but cheek-crescents not so well defined and not extending forward to base of bill, and much less clearly defined and less uniformly whitish collar); also by less evenly barred primaries below, often fine shaft-streaks on sides of chest and flanks, more rufous lateral tail-feathers more evenly banded below and, when present and visible, barred axillaries. **Immature male** See comments on moult and face pattern in 'Perched'; worn juvenile outer primaries may remain in second autumn, when inner primaries are new and black, resulting in wedge of black on wing-tips like Pallid, and occasionally, even in second spring, new secondaries have much less conspicuous dark bar above, but in such cases immature males should always be recognised by developing grey on throat and chest. **Immature female** See 'Perched'; best aged by old juvenile flight-feathers (secondaries darker than rest of wing).

**CONFUSION SPECIES** In all plumages, this most delicately built and graceful of the harriers is relatively easily distinguished in Eurasia and north Africa from corresponding plumages of Hen Harrier [93] (heavier-bodied and looking shorter-winged with more rounded hands and broader arms, less buoyant flight; generally paler grey male with clear-cut grey hood, white rump and plain white underbody, no wing-bars, but dark trailing edges below; juvenile streaked below and, like adult female, less distinctively marked on more owl-like face). But, except for adult males, distinction from Pallid Harrier [96] much more difficult and always important to determine age-class (compare 'Perched' and 'Flight' sections and note differences remarked upon above, especially patterns of face, underwings and axillaries, streaking on underbody, and tail-barring). Rare dark morph would need to be distinguished from all-dark individual (juvenile or even adult female) of Northern Marsh Harrier [100] with similarly paler-based primaries below (at opposite end of harrier scale for bulk and round-tipped broad wings); this morph has not been recorded in southern Africa, where another possible confusion, chiefly when perched, would be adult Black Harrier [92] (white rump, more boldly banded tail, rounder wings with flight-feathers mostly grey above and white below).

**VOICE** Usually silent away from breeding area, and even there rather quieter than many other harriers, but comparable range of calls. Chattering shows less difference than Hen Harrier [93] between sexes. Rapid *chuk-chuk*

from male in sky-dance and against intruders, usually in shorter series than congeners, while female version only slightly shriller; this call sometimes preceded by double chitter. Other calls by both sexes, but especially female, include sharp *puik*, sometimes extended into whine, as appeal for food or when soliciting; sometimes combined with double or treble *chuk-chuk* of main food-call.

**FOOD** As suggested by much lower RSD, more essentially ground-feeder than Pallid [96]. Small mammals (especially shrews and voles) and adults, young and eggs of terrestrial birds (especially larks and pipits *Anthus*, but also eggs and nidifugous young of gamebirds and waders) usually main foods in breeding season, and large insects (especially orthopterans, mantids, beetles), reptiles (mainly lizards) and amphibians (largely frogs) typically of more significance in winter quarters, though any of these foods may predominate locally at either season. More occasional prey include mammals to size of small lagomorphs, and birds to size of doves *Streptopelia*, button-quails *Turnix* and partridges *Alectoris*, along with snakes, toads, even carrion. Most vertebrate prey 35–60 g, some to 300 g, rarely to 1 kg. Forages like other harriers (see Hen [93]) by low flaps-with-glides, usually at heights of 1–5 m (see fig. 35); catches almost all prey on ground (cf. Pallid), usually by short turn and drop, or sometimes by tail-chasing running animals, but will snatch low-flying termites in Africa.

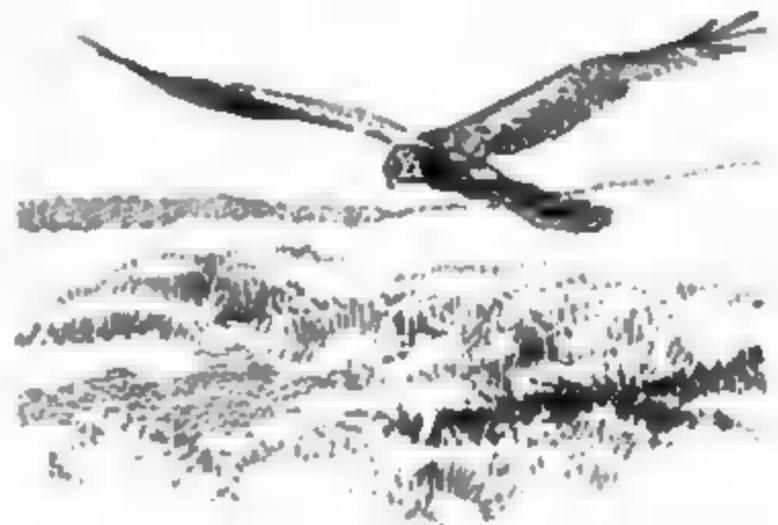


Fig. 35. Female Montagu's Harrier *Circus pygargus* [98] slowly quartering low over short, sparse vegetation in the manner typical of harriers in general, flapping then gliding on raised wings.

**SOCIOSEXUAL BEHAVIOUR** Solitary to gregarious; often hunts singly, except at abundant food, where up to 50+ recorded together, but 3–30 pairs sometimes nest semicolonially (10–60 m apart (once c20 nests in 2–3 ha); polygamy occasional to not uncommon; and, outside breeding season, migrates in small parties and roosts communally in groups of up to 50 or more, often with Pallid Harriers [96] and sometimes also Northern Marsh Harriers [100], one such mixed roost in northwest India holding some 1,500 birds. Aerial displays, often accompanied by much calling, include single or mutual high-circling, stoops, chases, rolls, talon-presentation, and floating to and fro. Male's sky-dance very variable, but involves series of plunges down towards nest site – sometimes diving on half-closed wings, sometimes spiralling with wings spread and tail fanned – interspersed with rapid level flight and frequent changes of direction, all combined with somersaults, rolls and

loops. Aerial food-pass used from courtship stages onwards, but mainly while female incubating eggs or tending smaller young.

**BREEDING** Mid April–mid August, starting four weeks later in north of range than in south. Nest is shallow pad of grasses, rushes and other local vegetation in dry site, or flattish heap in wetter area, 20–25 cm (rarely even up to 80 cm) across and 5–15 cm high, in tall grass, reeds, low scrub, young plantation or growing crop. Clutch 4–5 (3–10). Incubation 27–30 days (usually 28–29 days, but up to 40 for whole clutch). Fledging 35–40 days (32–42), but young start to move from nest after second week; dependent for further 10–14 days.

**POPULATION** Summer range extends over some 9 million km<sup>2</sup>, but densities vary greatly: highest in eastern Europe and, probably, west-central Asia; good numbers in parts of Iberia and France; generally few in central Europe and very few in north Africa and Asia Minor, handful in Britain. Breeding regular in about 18 countries of all Europe, as well as in very small or uncertain numbers in another five, and irregular or occasional in six more, but the bigger totals are all from west and east: Portugal (400–900 pairs), Spain (3,600–4,600) and France (c3,500); and Poland (c400), Baltic Republics (total 280–380), Belarus (600–1,100), Ukraine (once very common, but now almost confined to northeast and east) and European Russia itself (estimated 25,000 pairs); only two or three other countries exceed 100 pairs (Germany, Hungary and, at least formerly, Italy) and most of remainder hold mere handful each. Numbers in northwest Africa very small (probably tens only). In Asia, for which few data but where, apart from Turkey (c500 pairs?) and northern Iran, main distribution is in Kazakhstan and Russia itself north to steppes of western Siberia, an area approximately equal to that of European part of former USSR, so perhaps another 25,000–30,000 pairs? Thus, with possible 50,000–60,000 pairs for former USSR, 10,000–11,000 in rest of Europe and at least 100 pairs in northwest Africa and Asia Minor, total population at lower end of six-figure scale seems likely. West and central European figures generally represent declines since 1950s, following spreads and increases in

preceding decades, while farther east, populations more stable or even locally increasing. Declines in western Europe show links in time with organochlorine pesticides and with both locust control and the drought in the Sahel (east European populations winter farther east and south in Africa). Intensification of farming has resulted in much more nesting in crops, where mechanisation affects nesting success; in France, where in one region up to 90% of nests were being destroyed by agricultural machinery, many are now saved each year by protecting immediate vicinities and, if necessary, temporarily moving young. Changes in farming practices are also affecting numbers of small-bird and small-mammal prey, with potentially even greater adverse influence on this harrier's populations.

**GEOGRAPHICAL VARIATION** Monotypic. Rare dark morph is described under 'Perched' and 'Flight'.

**MEASUREMENTS** ♂ wing 342–393 mm, ♀ 350–395 mm; ♂ tail 200–237 mm, ♀ 209–250 mm; ♂ tarsus 52–65 mm, ♀ 56–70 mm. **Weights** ♂ 227–305 g, ♀ 254–445 g.

**REFERENCES** Ali & Ripley (1978), Beaman & Madge (1998), Berthemy *et al.* (1985), Brown *et al.* (1982), Cheng Tschsin (1987), Christensen (1977), Clarke (1993), Clark (1997), Clark & Schmitt (1999), Cormier (1985), Cramp & Simmons (1980), Delin & Svensson (1988), Dementiev & Gladkov (1951), Echécopat & Hùe (1978), Farall (1994), Flint *et al.* (1984), Forsman (1993, 1995, 1999), Gammell (1979), Gensbøl (1986, 1995), Giacchini & Pandolfi (1994), Ginn *et al.* (1989), Glutz von Blotzheim *et al.* (1971), Grimes (1987), Grimmett *et al.* (1998), Hagemeijer & Blair (1997), Handrinos & Akriotis (1997), Handrinos & Demopoulos (1983), Harris *et al.* (1989), Hays (1971), Hiraldo *et al.* (1975), Hollom *et al.* (1988), Kemp & Kemp (1998), Kitowski (1994), Kjellén (1992), Knystautas (1993), Krogulec & Leroux (1994), Lontkowski & Skakuj (1995), Lundevall & Rosenberg (1954), Meyer de Schauensee (1984), Nieboer (1975), Pandolfi & Barocci (1994), Pandolfi & Pino d'Astore (1988, 1990a/b), Pickford *et al.* (1989), Porter *et al.* (1981, 1996), Roberts (1991), Robinson (1950), Rogacheva (1992), Schipper (1973, 1978, 1979), Shirihai (1996), Shirihai & Christie (1992), Shirihai *et al.* (1996), Steyn (1982), Svensson (1971), Thiollay (1968a, 1989c), Underhill-Day (1993), Utendörfer (1939, 1952), Zimmerman *et al.* (1996).

## 99 AFRICAN MARSH HARRIER *Circus ranivorus* (Daudin, 1800)

Plate 30

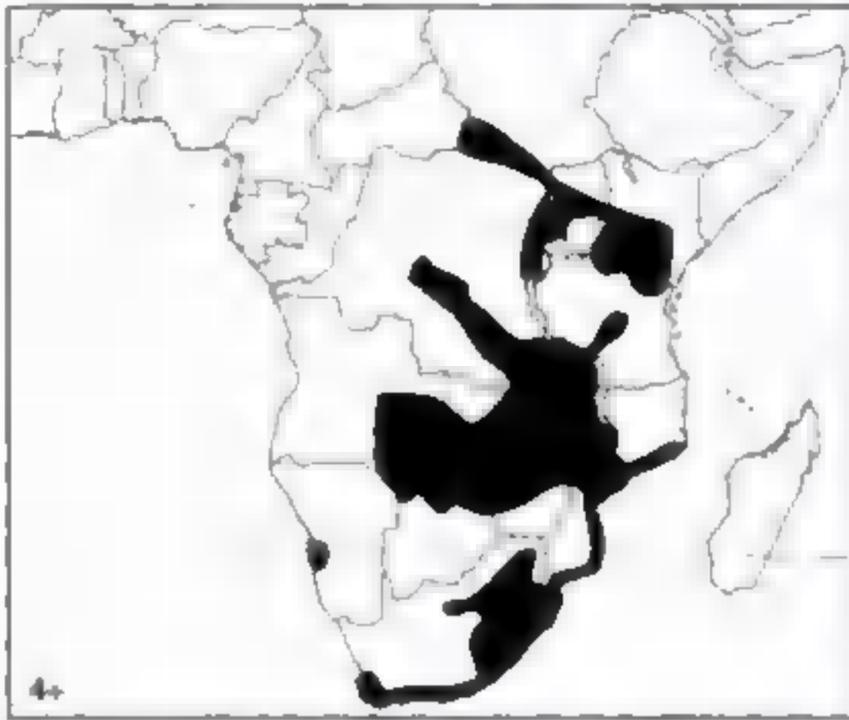
**DISTRIBUTION** Afrotropical (4°N to 35°S); order 4+; scarce to locally common. East and southern Africa: Uganda and Kenya south patchily through mainly eastern DR Congo and western Tanzania, Mozambique, Malawi, Zambia, southeast Angola, northeast Namibia, north Botswana and Zimbabwe to eastern and southern South Africa.

**MOVEMENTS** Regarded as resident at well-vegetated lakes and other permanent large wetlands, particularly in north of range, but nomadic in response to seasonal water levels, especially when burning or grazing then involved. Juveniles also tend to disperse from the breeding areas. Recorded north to Somalia, southern Ethiopia and, perhaps, southwestern Sudan.

**HABITAT** Mainly permanent marshland, not necessarily any bigger than 1–2 ha, with reeds or other emergent vegetation, but also seasonal swamps; often forages over adjacent grassland and open country, including wheat and other cultivation. Sea-level to 3,000 m, mostly above 1,500 m in East Africa.

**FIELD CHARACTERS** Mid-sized harrier similar in shape to Northern Marsh {100} but generally smaller and slimmer, and in all plumages brown and rufous with variable white markings. Perches on ground, mounds or posts; wings well short of tail-tip. Sexes rather similar (like most southern harriers), but female averages nearly 7% larger; juvenile distinct; as adult in third year.

**PERCHED Adult** Dark brown above, edged with rufous



and respectively dappled and edged with white on shoulders and other wing-coverts; boldly barred tail; facial ruff outlined in white; throat and breast streaked brown and white, but abdomen and thighs usually plain rufous to brown, sometimes variably streaked with white. **Juvenile** All dark brown, more chestnut on flanks and belly, but for white in variable patches on forehead, throat, nape and shoulders and as uneven chest-band. **Immature** Subsequent stages not clear, but like other marsh harriers probably intermediate immature plumage before full adult in third year. **Bare parts** Adult eyes yellow, juvenile brown. Cere yellow, often duller or greener on juvenile. Feet yellow.

**FLIGHT** Smallish to mid-sized raptor with shape and actions much as other harriers; wing-tips somewhat rounded like Northern Marsh [100]. Invariably glides and soars with wings in shallow dihedral. **Adult** Looks dark above with whitish-speckled forewings, obscurely dark-banded flight-feathers, much more clearly barred tail, and rufous rump (very thinly white-edged in fresh plumage); below, paler and more rufous with whitish-streaked breast, red-brown streaks on buff wing-linings, and whitish-based primaries and greyer secondaries all thinly but clearly barred. **Juvenile** More uniformly dark, particularly above, but with white on forearms and variably on nape and face and across chest; plainer-looking tail, but again rufous rump; chestnut abdomen and wing-linings, latter variably streaked blackish and white; greater contrast than adult between whitish-based primaries and mainly grey secondaries.

**CONFUSION SPECIES** Likely to be confused only with migrant female or juvenile Northern Marsh Harriers [100], which are slightly larger and stockier, proportionately shorter-tailed, and in general brown, not rufous or chestnut, while the western populations that reach Africa have plain tail. Nevertheless, female or second-year Northern Marsh with creamy forewings and large pale patch on breast could look very like juvenile African Marsh with only obscurely barred tail; then latter's more clearly white-based and barred primaries, and white on nape but not crown, might be quickest distinctions. Migrant female and juvenile Pallid Harriers [96] and (except unmistakable melanistic morph) Montagu's Harriers [98] readily distinguished from African Marsh by white rump as well as different build.

**VOICE** Silent except near nest site. Plaintive whistling

*peer-uk* and softer *to-woot* in courtship, former also used by female in response to male's sharp *peu* before food-pass. Squealing *oweeep* in sky-dance and sky-spiralling (see Sociosexual Behaviour). Various other soft and chuckling notes related to contact, courtship and bringing food to nest. Loud ringing chatter *kyak-kyak-kyak...* in alarm, and croaking in distraction.

**FOOD** Mainly small mammals (especially mice) and birds, some nestlings and eggs, also frogs, insects and occasional carrion; reptiles and fish apparently rather rarely. Bird prey recorded up to size of small ducks and doves. Nests in heron colonies sometimes raided. Foraging methods much as other harriers (see Northern Marsh [100]), flying at 5–20 m above ground, but perhaps more regularly uses fast downwind surprise tactics along water channels.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs; hunts and roosts singly. Normally monogamous with long-term pair-bonds; only one possible case of polygyny recorded. In courtship flights, pairs soar and circle high over marsh, male periodically diving at female, who presents claws. Male, sometimes with female, also indulges in impressive sky-dances and sky-spiralling while descending from great heights. In high horizontal sky-dance, sometimes with backward loops to complete full circle, bird performs 10–12 undulations per minute (mostly for 2–3 minutes, but up to 20 minutes) with exaggerated rowing beats, then falls steeply 20–40 m before swinging upwards with flailing wings, giving squealing *oweeep* at peak, before stooping earthwards. Sky-spiralling begins with wing-rowing before dropping in series of fast spiralling undulations, calling at each peak before terminating near ground or at nest; as falls, twists violently about its axis, producing flailing uncontrolled appearance. Female called off nest to receive food-pass in typical harrier fashion.

**BREEDING** June–October in Kenya, December–August in Zambia and Zimbabwe, and mainly September–January (May–February) in South Africa. Nest varies from stick-based heap of reeds and grass in reedbeds, 45–60 cm across and up to 1.5 m above water, to small pad of grass hidden among dry vegetation (rarely wheat); one South African nest 3 m above ground in low bushy tree. Clutch 3–4 (3–6). Incubation 31–34 days. Fledging 36–41 days.

**POPULATION** Although apparently still well represented at some wetlands in both eastern and southern Africa, particularly in Uganda, Botswana and Zambia, the species has clearly decreased, very notably in Kenya (where now regarded as 'local and uncommon' with no recent breeding records, and 'scarce' even round the huge Lake Victoria) and north Tanzania, and in the southern half of South Africa itself. Numbers in north-eastern South Africa (former Transvaal) were guessed at 500–1,000 pairs in 1980s, but, from the sparse and scattered data available, it seems unlikely that the continent's whole population, including immatures, now reaches five figures. Drainage or damming of wetlands and, particularly at smaller reedbeds, increased grazing and human disturbance are all serious threats. Some sites periodically destroyed by fires, but these, like seasonal swamps, may be recolonised when new growth established. Possible effects of pollution or pesticides

not fully evaluated, but all six eggs from five nests examined in 1984/85 showed residues of DDT and its metabolites, and four also PCBs and dieldrin.

**GEOGRAPHICAL VARIATION** Monotypic. Sometimes regarded as conspecific with other marsh harriers [100–102], but proportions, plumage, limited sexual dichromatism and behavioural differences make it perhaps the most clearly distinct of this very widespread Old World group. The four marsh harrier species recognised here (and up to three others currently treated by us as races) are best considered to form a superspecies, but a particularly complex one.

**MEASUREMENTS** ♂ wing 340–368 mm, ♀ 365–395 mm; ♂♀ tail 210–248 mm, ♂♀ tarsus 72–82 mm. **Weights** 382–590 g (six averaged 567 g, but one immature weighed 606 g; only one was ♂, at 423 g).

**REFERENCES** Benson & Benson (1975), Biggs *et al.* (1979), Britton (1980), Brown *et al.* (1982), de Kock & Simmons (1988), Dowsett & Dowsett-Lemaire (1980), Ginn *et al.* (1989), Kemp & Dean (1988), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957–75), Maclean (1993), Malherbe (1970), Nichol (1963), Pickford *et al.* (1989), Pinto (1983), Snow (1978), Simmons (1990, 1991a, b, 1992a), Steyn (1982), Tarboton & Allan (1984), Zimmerman *et al.* (1996)

## 100 NORTHERN MARSH HARRIER *Circus aeruginosus* (Linnaeus, 1758)

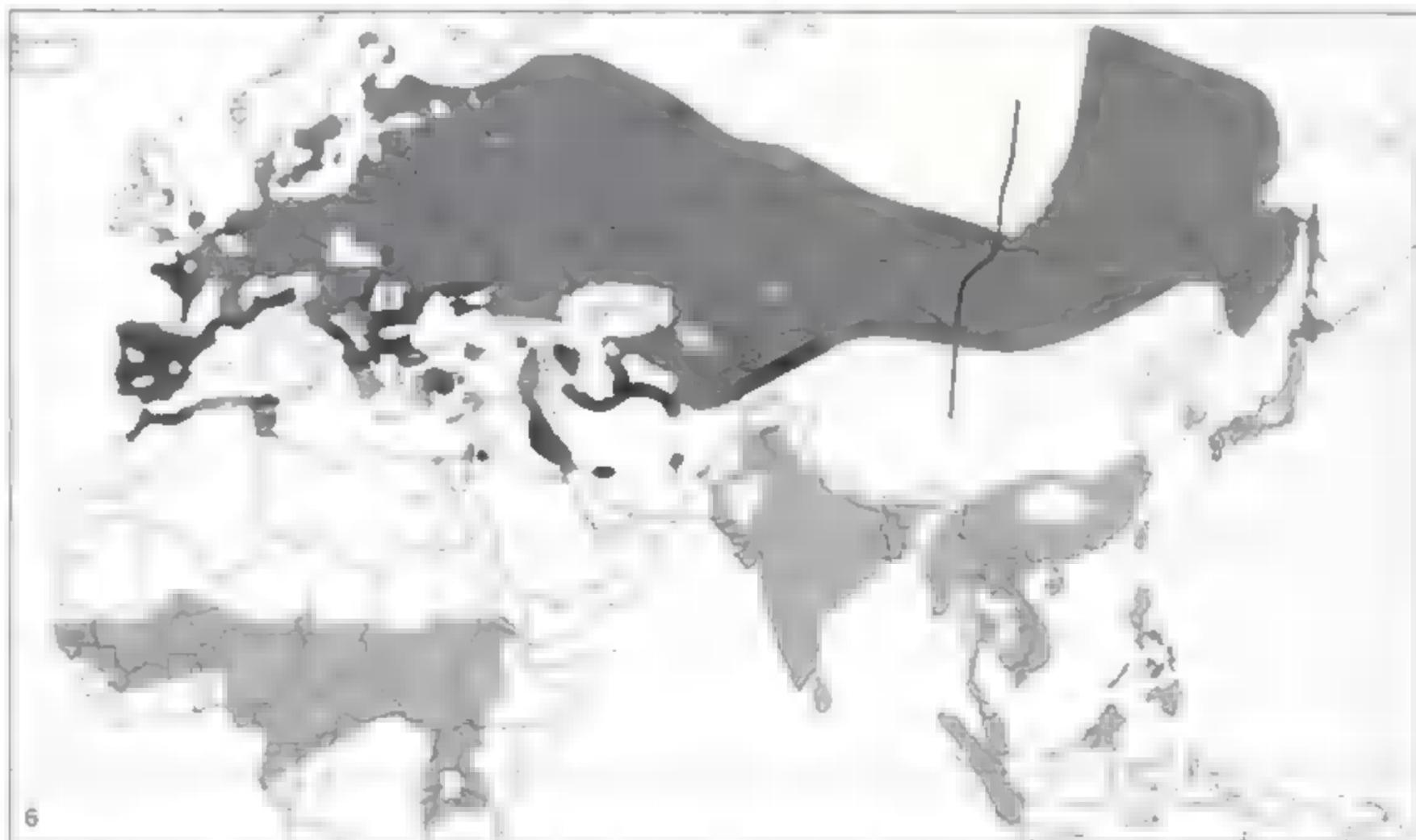
Plate 32

Other names: Eurasian Marsh Harrier, Western Marsh Harrier; Eastern Marsh Harrier (*spilonotus*)

**DISTRIBUTION** Palearctic and, in winter, also Afrotropical and Indomalayan (breeds c67°N to 30°N, in east only to c40°N, in winter to 53°N but mainly 48°N to 28°N in west and to c8°S in east); order 6; variously common, or locally very common, to uncommon or, especially in eastern range, scarce, but numbers fluctuating and population trends not always clear. Breeds northwest Africa, Europe and across central Asia to Pacific: northwest Africa from Morocco east to Tunisia, and from Spain and Portugal, France, Britain (mostly southeastern quarter) and Ireland (recolonised 1991), eastward through virtually all countries of Europe (north to Arctic Circle in Fennoscandia, but in Norway only in south) and south to Turkey, then, apart from outposts in southeast Iraq and south and east Iran, from Azerbaijan and northeast Iran in broad band across central Asia

(extending north to middle Irtysh and upper Yenisey and south to south Kazakhstan) to northwest Mongolia and Lake Baikal, east of which range (of *spilonotus*; see Geographical Variation) extends north to southeast Siberia (southern Yakutskaya) and east to southern shores of Sea of Okhotsk, Ussuriland, Sakhalin, northeast China and north Japan (Hokkaido, has bred north Honshu).

**MOVEMENTS** Southern and west European populations resident and dispersive, or make only short-distance movements, or to some degree nomadic, and north African populations apparently fully resident. Chiefly migratory in north and east Europe and through most of Asia, although some remain all year in southernmost parts of breeding range. Main wintering areas of European migrants are in western and southern parts of that continent and in West Africa; those from western Asia appear to move largely to Nile valley and East Africa, relatively few crossing equator (and then west only as



far as southeast Zaire, east Angola and east Botswana, and very scarce south to Natal), while some remain in Asia Minor and Middle East; central Asian populations move mainly to Indian subcontinent south to Sri Lanka and Maldives, and east to Burma (and, rarely, central Thailand), while those from east of Lake Baikal (*silonotus*) winter from northeast India and Burma across south China, Taiwan, and south to Malay Peninsula, Greater Sundas (Sumatra, north Borneo, few reach Java and Bali) and Philippines; Japanese breeders migrate from Hokkaido to central Honshu and Kyushu. Leaves breeding areas September–October, returning March–April but in north not until May, travelling on broad front with rather small concentrations at migration bottlenecks: e.g. peak totals in autumn at Falsterbo 928, at Gibraltar 200–400 annually, and in Israel 1,554 through northern valleys and 1,257 at Kfar Kesem; in spring, major passage across central Mediterranean (up to 978 at Cap Bon in Tunisia and up to 900 annually in northeast Italy), but maximum total at Eilat only 371. Few data from eastern Asia, where huge autumn passage of thousands of Pied Harriers [97] along Chinese coast thought to include reasonable numbers of *silonotus*. Vagrants recorded many areas, including islands of east Atlantic (Madeira, Canaries, Cape Verde) and Indian Ocean (Seychelles).

**HABITAT** Open wetlands with extensive and dense, tall emergent vegetation, predominantly reeds and bulrushes: such wetlands usually shallow, can be fresh or brackish, and include typically lakes, swamps, marshes, bogs, margins of large slow-flowing rivers, deltas and floodlands, generally with few or widely scattered trees, but preferably with continuous aquatic vegetation cover of 50 ha or more, but smaller reedbeds and even reed-filled ditches commonly accepted; also rushy grassland, and more recently in Europe (and probably elsewhere?) dry fields of cereals or rape *Brassica napus* by no means uncommon as nesting habitat. Forages out also over drier areas such as farmland, grassland, as well as paddy-fields and the like. On migration and in winter, uses variety of both wet and dry habitats, including saltmarshes, saltpans, ploughed fields, and sometimes observed over forested areas and in mountains, and will then roost (communally) on ploughland as well as in reedbeds, rushes or long grass. Resident northeast African race (*harterti*) breeds and forages also in dry scrub, woodland and plantations. Breeds from sea-level to c400 m, to 1,800 m in northeast Africa, to 2,000 m in central Asia; in winter and on passage recorded at up to 3,000 m in Africa (e.g. Cameroon) and Nepal.

**FIELD CHARACTERS** Large, relatively bulky harrier, male brown and grey with streaky creamy or rufous head and underparts (but all black and white in east Asia), female and juvenile brown with creamy/buff on head, all with less obvious facial ruff than most other harriers (e.g. Hen [93]), and long wings and tail, smallish head, long slender legs. Stands horizontally on ground, and perches openly and, at times, more upright on post, tree stump, bush or other slightly elevated vantage, though rarely in tree; wing-tips short of tail-tip. Melanistic and partly melanistic individuals occur throughout much of range, and others with very pale foreparts reported (see Geographical Variation). Sexes dissimilar, female also

averaging c5% larger and up to at least 16% heavier; juvenile usually distinct and, although sometimes breeds at two years, not fully adult until at least three.

**PERCHED Plumages** Two distinct forms occur: eastern *silonotus* sometimes considered separate species (see Geographical Variation) and its various plumages therefore described here in full, after western nominate race. **Adult male nominate** Variably dark-streaked creamy to straw-yellow or rufous (even partly greyish) head in some contrast to dark brown upperparts (edged rufous when fresh), normally with thin creamy-buff on shoulders, and black primaries distinctly contrasting grey secondary-panel that extends onto greater coverts and plain light grey to silvery-grey tail; below, creamy to rusty-brown with heavy dark rufous streaking, becoming more solidly dark on lower belly; but variable, and older males normally palest and brightest, with greys more silvery, while young adults (three years old) generally darker and often with virtually unstreaked rufous underparts from breast to crissum. **Melanistic adult male nominate** But for normal light silver-grey tail, plumage entirely dark blackish-brown, making bright yellow eyes stand out conspicuously; small blue-grey wing-panel evident only in favourable light, and even then not always. **Adult female nominate** Largely dark chocolate-brown, edged rufous above (fresh) and tinged rufous on uppertail, with variably but lightly dark-streaked pale creamy crown, nape and throat, thus leaving prominent dark eye-band, and usually variable amount of cream on forewing-edge (at times also scapulars); normally a pale patch or mottling on breast; but some lack all or most pale areas and then very like all-dark juvenile (see below) but for rustier tail, while other, older females approach adult male in greyer tail and, occasionally, grey-tinged secondary-panel. **Melanistic adult female nominate** All dark blackish-brown, and in field probably indistinguishable from all-dark juvenile. **Juvenile nominate** Typically dark brown, even blackish-brown in fresh plumage, but for unmarked deep ochre to rufous-buff crown, nape and throat, dark rufous tips to greater coverts (evident in good view, soon worn off), and occasionally ochre area on inner forewing; but can lack ochre markings, or have just pale nape-band, or few pale streaks on breast, or various combination of these and above-mentioned ochre markings; with wear, ochre areas become much paler. **First/second-summer male nominate** Following partial body moult in first winter, and extensive plumage wear, appears much paler than juvenile, and with streaked crown and often contrast between bleached upperwing-coverts and darker flight-feathers; by second winter/summer some blue-grey feathers in wings and tail, latter with darker subterminal band and faint bars at sides (invisible when perched), and underbody more streaked, but otherwise not dissimilar to adult female. **Eastern adult male (*silonotus*)** Head, neck to upper mantle and upper breast black with broad white feather edges and looking black-streaked whitish, or sometimes pale edgings more or less absent and then appear all black but for, usually, broken white collar; otherwise upperparts and wings black with broad white edges and tips, apart from contrasting grey-white secondaries and greater coverts and pale grey tail; underparts below breast white, with variable thin black shaft-streaks normally strongest on flanks and thighs (belly

to crissum often unmarked). **Eastern adult female (*spilonotus*)** Mainly rufous-brown above with rufous and white feather edges, except for creamy shoulders with few dark streaks, blackish-barréd grey remiges, and rufous-grey tail with about five obscure dark bars; streaky head, plainer rufous ear-coverts; creamy below, streaked brownish on breast and more strongly and broadly rufous on belly and flanks, thighs with broad rufous arrowheads. **Eastern juvenile (*spilonotus*)** Variable, but usually mostly dark brown above, apart from creamy (often lightly dark-streaked) crown, neck and breast, plain creamy-white chin and whitish shoulders, some individuals also having some creamy streaks on mantle; tail barréd; lower breast to crissum unmarked dark rufous. **Eastern immature male (*spilonotus*)** Poorly described: shows mix of juvenile and adult male feathers, e.g. much black on head and upperparts and some light grey feathers in wings and tail, while underparts more heavily streaked than adult; but variable, and some individuals more female-like. **Bare parts** Adult eyes yellow, juvenile dark brown. Bill-base blue-grey. Adult cere yellow, juvenile greenish-yellow. Legs and feet yellow. **FLIGHT** Mid-sized raptor with slim body, long and rather broad and rectangular wings narrowing at hands and having relatively rounded five-fingered tips (female somewhat stockier, more compact, broader-winged, juvenile slimmer and narrower-winged with S-shaped trailing edges), long and fairly narrow rounded tail (at times looking more square-ended) equal to wing breadth; wingspan 2.7 times total length. Buoyant flight, with few beats between glides rather heavy compared with other harriers (e.g. Hen [93]), though lighter male can still appear agile; soars and glides on V-held wings, carpal pressed forward in glide and then tilting side to side. **Adult male nominate** Distinctive above, with pale crown and otherwise tricoloured pattern of silvery-grey flight-feathers, primary coverts (sometimes inner greater coverts, too) and tail, black outer hands and brown upperparts and wing-coverts; usually some buff on shoulders and often narrow white rump-patch; below, wings whitish with contrasting black ends and variable dusky trailing edges, linings either rufous with dark streaks or (older birds) whitish with few or no streaks, and underbody similarly variable from rufous-brown and streaked to largely creamy with heavy rufous streaks/blotches, but crissum nearly always clearly rufous and tail always light grey. **Melanistic adult male** Basically blackish-brown with silvery-grey tail, apart from greyish-white bases to flight-feathers below (most obvious on hand) that form contrasting underwing-band; in favourable view may be possible to discern dark blue-grey area on upperwing, but always less extensive than on normal male and apparently confined more to inner primaries. **Adult female nominate** Above, appears darkish brown with creamy crown and nape and usually creamy leading edges to inner wings, with rufous-tinged tail; and mostly dark brown below, apart from creamy throat which, with similar-coloured crown, sets off dark eye-mask, and variable pale breast-patch, while underwing often with paler bases to primaries and some pale mottling on linings; some, however, without or with greatly reduced pale areas of plumage, then separated from all-dark juvenile by rufous tinge to tail, whereas others (old females), with greyer tail and sometimes grey on wings,

approach adult male. **Melanistic adult female nominate** All dark blackish-brown, and in field probably indistinguishable from all-dark juvenile. **Juvenile nominate** Generally dark brown, often blackish-looking, with slightly paler tail, and with prominent blackish mask outlined by plain creamy-ochre to rufous-buff crown, nape and throat (occasionally also creamy on shoulders), and with paler bases to underprimaries; or, less often, more or less all dark with no ochre. **First/second-summer male nominate** Paler and more variegated than juvenile; above, pattern suggesting adult male but darker, grey on wings duller and less extensive (restricted mainly to inner primaries), and often contrast between faded wing-coverts and dark brown remiges (including most of secondaries), while dull grey tail shows some rufous and a dark subterminal and obscure side-bars; head and body resemble adult female, and, below, wings rather dark with pale bases to primaries and sometimes (brighter individuals) also secondaries; variable, however, and less advanced birds can be difficult to separate from adult females. **Eastern adult male (*spilonotus*)** Striking pattern above of black-streaked (occasionally all-black) head, white-edged black upperparts, white-streaked black lesser and median (and inner greater) coverts and solidly black outer six primaries all contrasting pale grey rest of wings, which enhanced by blackish subterminal spots on primary and greater coverts, and light grey tail with diffusely darker end, along with thin white leading edges of arms and narrow white rump-band; very pale and white-looking below, except for bold black wing-tips, diffuse dark trailing edges, and black-streaked (occasionally all-black) throat to upper breast and much more thinly and sparsely streaked flanks. **Eastern adult female (*spilonotus*)** Streaky pale head and shoulders and streaked rufous upperparts, including wing-coverts, contrast with dark-barréd greyish flight-feathers, latter with blackish tips and trailing edges; rufous-spotted white rump-band, and rufous-sided grey tail with thin bars either complete or, sometimes, restricted to outer feathers; below, apart from paler body with dark rufous streaks, pattern similar but with much paler primary bases. **Eastern juvenile (*spilonotus*)** Mainly dark brown to rufous-brown above, with usually dark-streaked pale crown and fore lesser coverts and sometimes buff streaks on mantle, tail only obscurely barréd, if at all; below, pale creamy head and breast streaked dark, lower body and wing-linings more rufous and less streaked, but most prominent feature is large unmarked pale patch at base of primaries contrasting with plain dark remiges and blackish wing-tips. **Eastern immature male (*spilonotus*)** Poorly documented, but many show mix of brown juvenile feathers and new grey ones in wing.

**CONFUSION SPECIES** Except in east Asia (see below), adult male normally unmistakable, but older individuals with very pale underwings could be mistaken at long range for adult male Hen Harrier [93] (all-grey upperwing-coverts, grey forebody contrasts pure white belly to crissum). On non-breeding grounds in Africa, nominate adult female and juvenile confusable with African Marsh Harrier [99]: if that species' slightly smaller size, slimmer build and proportionately longer tail not obvious, look for tail pattern (always barréd) and generally more chestnut/rufous (less brown) coloration (adult also fully

vegetation, often reedbed, or among thick plants growing in shallow water (and then up to 70+ cm deep); locally in Europe in dry field (especially crops, rape) or in low hedge or shrub, exceptionally up to 15 m above ground in tree, and in northeast Africa (*harterti*) in dry scrub. Clutch 4–5 (2–8). Incubation 31–38 days (up to 48 days reported for *spilonotus* in Japan). Fledging 35–40 days; dependent for further 2–3+ weeks.

**POPULATION** General decline in numbers and contraction of range in west throughout at least first half of 20th century, but since 1970s and particularly 1980s recovered in much of this area and by end 1990s populations in most of Europe appear healthy. Estimates in early 1990s gave 51,000–74,000 pairs in Europe, most in east and central parts but especially in Russia, Poland and Ukraine (combined total 34,000–55,000 pairs), and with c2,200–3,000 pairs in both Belarus and Germany (higher estimate of 10,000 in last considered unlikely) and 1,000 or more in at least four other countries (Netherlands, France, Czech Republic, Hungary). These figures compare with suggested 10,000 pairs in Europe (excluding Russia) in 1980s, only one-third of latest estimate. Evidence of real increase provided by data from Netherlands (1991–92 population of 1,370–1,410 pairs more than twice that of 1970s), Denmark (fewer than 100 pairs in 1970, increased to 610 in 1987) and Britain (average annual increase between 1970 and 1991 almost 20%). On other hand, general decline recorded in south Europe, where Spanish population several hundred pairs down on 1974, and numbers only in low hundreds in Portugal, Italy and Greece. Widely varying assessments of Turkish population include 'perhaps 100–250' pairs (1980s) and 500–5,000 pairs (1990s), but true figure at best unlikely to exceed 2,000. No meaningful data from Asia, where range of nominate race covers area at least equal to that in Europe and species is said to be reasonably common locally, while migrants are common and widespread in Indian subcontinent and not uncommon in East Africa, so a figure of, say, 50,000 pairs might be expected. East of Lake Baikal, *spilonotus* appears to be patchily distributed and generally rather scarce, and is 'rather uncommon' in Japan; it covers an area not much greater than Asian range of nominate *aeruginosus*, and a population of perhaps 20,000–30,000 pairs seems a reasonable assumption. In northeast Africa, *harterti* considered to number up to c500 pairs in 1980s. Thus, combining assessments for all three subspecies, world total in region of 120,000–150,000 pairs is possible and, given fledging rate of often 2–4 young and recorded longevity up to 16 years, a total population in the middle six-figure range. Earlier decline precipitated by loss of wetlands, both through drainage and by natural drying-out, combined with persecution, effects of pesticides and ingestion of lead shot from wounded animals, as well as general environmental pollution. Following widespread banning, in stages, of DDT and other persistent pesticides, and reduction in hunting pressure in southern Europe, numbers recovered in most of Europe, and in Netherlands species benefited further from colonisation of reclaimed land by huge reedbeds. Although same threats persist, especially habitat loss or degradation (wetland destruction in east Europe and Asia, evaporation and drying in increasingly hotter climates as in Spain) and lead

poisoning, these offset to some degree by species ability to adapt to drier habitats (see Habitat), where probably also less likely to suffer persecution; but illegal shooting still major problem locally, especially in Mediterranean region, where, for instance, Maltese hunters shoot vast majority of Northern Marsh Harriers attempting to pass through that country.

**GEOGRAPHICAL VARIATION** Polytypic, and sometimes considered (see B&A) to include as races African, Australasian and Malagasy Marsh Harriers [99, 101, 102], but we believe all four better treated as forming a superspecies (see also Geographical Variation paragraph under Australasian and Malagasy). Three races treated here.

*C. a. aeruginosus* (Europe, and Asia east to Lake Baikal and north Mongolia; winters west Europe and south to sub-Saharan Africa) See Field Characters.

*C. a. harterti* (northeast Africa from Morocco to Tunisia) Darker above, whitish head black-streaked, much paler and well streaked below, underprimaries sometimes barred; female almost pure white foreparts down to back and breast, belly to vent paler rufous than nominate.

*C. a. spilonotus* (east Asia from southeast Siberia and Lake Baikal east to Sea of Okhotsk, Sakhalin and north Japan, south to north and east Mongolia and northeast China; winters southeast Asia and south China, Greater Sundas, Philippines) Distinctive, much more black and white than nominate (see Field Characters).

Although *spilonotus* popularly regarded as separate species, and then sometimes including New Guinea race *spilothorax* of Australasian Marsh Harrier, it apparently interbreeds with nominate *aeruginosus* where the two meet in west and north Mongolia, producing offspring with variably intermediate characters; such intergrades recorded in winter in central Thailand. Otherwise, melanistic and partly melanistic individuals occur throughout much of range, seemingly more common in western and central Asia, but not reported for *spilonotus*. Others with very pale crown to mantle, shoulders and breast recorded from widely separated areas, but particularly around western Black Sea (Romania), though appear to be at best rather rare in occurrence.

**MEASUREMENTS** *C. a. aeruginosus* ♂ wing 372–418 mm, ♀ 404–426 mm; ♂ tail 213–237 mm, ♀ 225–252 mm; ♂ tarsus 79–92 mm, ♀ 86–93 mm. *C. a. harterti* ♂ wing 375–407 mm, ♀ 401–424 mm; ♂ tail 213–234 mm, ♀ 232–254 mm; ♂ tarsus 75–88 mm, ♀ 86–93 mm. *C. a. spilonotus* ♂ wing 384–414 mm, ♀ 404–429 mm; ♂ tail 218–239 mm, ♀ 238–251 mm; ♂ tarsus 84.2–93.5 mm, ♀ 89.7–96.9 mm.

**Weights** *C. a. aeruginosus* ♂ 405–730 g, ♀ 540–960 g.

**REFERENCES** Ali & Ripley (1978), Altenburg *et al.* (1982), Bavoux *et al.* (1992), Beaman & Madge (1998), Bergier (1987), Blanco *et al.* (1993), Bock (1976, 1978), Brazil (1991), Brazil & Hanawa (1991), Brown *et al.* (1982), Cheng Tso-hsin (1987), Clarke (1993, 1995), Clarke *et al.* (1993), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Dickinson *et al.* (1991), Dixie (1984), Etchécopar & Hùe (1978), Flint *et al.* (1984), Forsman (1999), Génshol (1986, 1995), Giraud-Audine & Pineau (1974), Glutz von Blotzheim *et al.* (1971), González (1991), Grimmett *et al.* (1998), Hagemeyer & Blair (1997),

Handrinos & Akriotis (1997), Hildén & Kalmainen (1966), Inskipp & Inskipp (1991), Jørgensen *et al.* (1982), Kemp & Kemp (1998), Kjellen (1992), Konradt (1966), Marchant *et al.* (1990), Misback (1972), Nishide (1979), Pain *et al.* (1993), Pniewski (1961), Porter *et al.* (1981, 1996), Roberts (1991),

Schipper (1977, 1978), Schipper *et al.* (1975), Shirihai (1996), Shirihai & Christie (1992), Simmons (1988, 1991a), Smythies (1981, 1986), Svensson *et al.* (1999), Thiollay (1970), Underhill-Day (1984), Wells (1999), Witkowski (1989), Zimmerman *et al.* (1996).

## 101 AUSTRALASIAN MARSH HARRIER

### *Circus approximans* Peale, 1848

Plate 33

**Other names:** Swamp Harrier or Hawk, Australian or Pacific Marsh Harrier; here also including Papuan (Marsh) Harrier

**DISTRIBUTION** Australasian (2°S to 47°S); order 5; locally common. Australasia, Melanesia and Polynesia; breeds New Guinea (except western promontary, but see Geographical Variation), southwest and southeast mainland Australia (much of remainder in southern winter), Tasmania, main islands of New Zealand, and various smaller islands and archipelagos of Tasman Sea and southwest Pacific, including New Caledonia, Loyalty, Vanuatu, Fiji, Wallis, Tonga and Chatham; also introduced Society Islands.

**MOVEMENTS** Generally sedentary on small islands, but more nomadic and partially migratory elsewhere; in New Zealand, some movement between the two main islands. In non-breeding season, many wander in response to changes in crops and other habitats, and according to availability of food. Almost entire Tasmanian population moves north to mainland in winter, especially June–July; farthest ringing recovery 1,520 km to northeast New South Wales. Birds from southern Australia also spread north over many less arid parts of the continent and some reach New Guinea, whence endemic race claimed about ten times (but not yet accepted) as vagrant to northern Australia. Irregular visitor to various other islands, such as Lord Howe, Norfolk, and even south to Kermadec and Macquarie, and straggles or vagrant to Snares, Auckland, Campbell, and even far west to Cocos-Keeling (one record) and northeast to Solomons (three records).

**HABITAT** Reedy lakes, swamps, floods, ricefields, saltmarshes and other wetlands, including vicinity of bores in arid central Australia, but hunts over any adjacent open country from grassland and crops to shorelines, coastal heath, and lightly wooded areas with scattered trees; in New Zealand, often over short-grass farmland and vegetated upland slopes and plateaux. Sea-level to 1,200 m in Australia, but *gouldi* to 1,700 m in New Zealand and *spilothorax* to 3,800 m in New Guinea.

**FIELD CHARACTERS** Largish bulky harrier, as adult mostly dark brown and creamy with streaked breast but variable, with typical owl-like facial ruff, and longish wings, tail and legs. Perches on ground, hummocks, banks, stumps, posts, and swamp vegetation, less commonly in trees; stance rather upright with leg length often obvious; wing-tips short of tail-tip. Sexes dissimilar, female also 0–20% larger and averaging over 30% heavier; juvenile separable, but becomes very like adult female after moult into immature stage in second half of first year, then as adult from late in second year.

**PERCHED Male** Dark brown above, edged rufous, with paler streaky head, white rump and, particularly when older, grey wash on obscurely barred flight-feathers and tail; whitish to cream below with rufous streaks, densest on throat and chest, sparser on lower breast, sometimes almost absent from abdomen. Oldest males become darker and greyer, beginning to resemble Papuan race (see below). **Female** Darker and browner above, with duller white rump, clearer tail-bands, and variable but



generally less clear grey wash on wing-feathers and central tail; more buff below, all heavily streaked rufous. **Juvenile** Mainly dark brown above, with whitish streaks or flecks on nape forming nuchal collar, rufous rump, and obscurely barred tail with broader subterminal band; dark brown to dark red-brown below. **Second-year** Much as adult female but for eye colour; immature female also darker below. **Bare parts** Adult eyes yellow (male and old female paler); juvenile dark brown (male becoming lighter); second-year male golden-yellow and female brown; third-year male as adult and female still brown. Cere and feet yellow at all ages, but sometimes adult male feet orange-yellow.

**FLIGHT** Medium-sized raptor, rather large and bulky for a harrier (but slimmer than many other hawks), with owlish face, long parallel-edged wings with somewhat rounded and fingered tips, and longish narrow tail round-tipped; wingspan 2.4 times total length. Flight buoyant, with series of smooth but heavy beats interspersed with long glides on shallow V wings, sometimes rocking or tilting to side; may hover briefly; soars with wings held in clear dihedral; like other marsh harriers, not uncommonly dangles legs in flight. **Male** Brown above with conspicuous white rump, and grey-washed and faintly barred flight-feathers and tail; white below with variably streaked forebody and wing-linings, whitish area at base of primaries, and thinly barred quills with slightly clearer trailing wing-edges and subterminal tail-band. **Female** Darker brown above, still with more or less white rump, and sometimes grey wash on both flight-feathers and more clearly banded tail; streaky rufous-brown below, but remiges patterned much like male. **Juvenile** Mainly dark brown above, shading to red-brown below, with white-streaked nape, rufous rump, faintly barred tail; flight-feathers below unbarred and only slightly paler than wing-linings, except that outer primaries have pale bases and blackish tips. [**Papuan male** (*spilotharax*; see Geographical Variation) Mainly black above but for variably white-streaked head and mottled scapulars, white rump, grey secondaries and tail (crown, face and scapulars blackest in highlands); and white below, with black-streaked throat and breast; in flight, all black and grey above, apart from white rump, and white below but for blackish forebody, wing-tips and trailing edges. **Dark morph** All black (including rump) but for dark grey tail, or somewhat paler-streaked head and breast; rare and confined (?) to highlands. **Papuan female** Similar to Australian race, though some have white streaks on head; in flight, more heavily barred (or sometimes plain grey?) tail and, below, clearer dark trailing wing-edges. **Papuan juvenile** Pale streaks on head and back.]

**CONFUSION SPECIES** Most likely is juvenile Spotted Harrier [91], also with pale rump, but that is slimmer, with wedge-shaped tip to more clearly barred tail, more fingered wings, and slower and even more buoyant flight; rump actually buff (not white), and forewings and head and underbody much more gingery. Juvenile Square-tailed Kite [35] has distinctively long and barred primaries, squared or notched and less banded tail twisted in flight, and much shorter legs. Female harriers with rufous underparts and barred underwings and tail often mistaken for Red Hawk [156] (more thickset, with flat head and crested nape, heavy legs and large feet, squared tail, less upswept wings in glide, quicker flight,

and no white rump). Note that Pied Harrier [97] may occur in New Guinea.

**VOICE** Usually silent except in breeding season. Call of male in display-flight is high, far-carrying, descending *whewoo* or *kyow*. Slightly lower and more drawn-out version uttered by female and recently fledged young when danger threatens. Human intruders evoke harsh scolding *kekkek*... Male approaching nest, particularly with food, gives low resonant *kak-ok*.

**FOOD** Birds and their eggs, mammals, frogs, snakes and other reptiles, large insects, occasionally fish, and carrion. Takes both terrestrial and aquatic birds, including coots *Fulica*, grebes and small ducks on open water. Mammals include particularly rabbits in Tasmania. Carrion especially important in New Zealand, including dead fish and roadkills. All prey caught on ground or water; if attack fails, usually no repeat or chase, though swimming waterbirds often harried: one teal survived numerous attacks by constant diving. Foraging methods typical of harriers (see Northern Marsh [100]), with low-level quartering, especially along edges of reeds or other cover, or sometimes transects in more open areas; prey then caught by sudden drop with talons held out. Faster-moving prey taken by direct flying attack. Also pirates food from other raptors.

**SOCIOSEXUAL BEHAVIOUR** Solitary to loosely gregarious, migrating in parties and roosting communally; occasionally polygamous. High-circling, usually by male alone, is common and often leads into undulating sky-dance with particularly deep dives and steep climbs interspersed with spiralling like falling leaf; in this respect at least, and in the fact that he calls at the peak of undulation (not when starting to climb), this display differs from that of Northern Marsh Harrier [100]. If female joins male in high flight, he may dive and swoop at her in play and she may then roll over and present talons.

**BREEDING** September–February; lays spring in southern Australia (though often later than other raptors), and slightly earlier in dry season farther north. Loose but substantial nest of grasses, sedges, reeds and sometimes small sticks, on ground or in shallow water, usually among reeds, occasionally in other rank vegetation or crops or, rarely, above ground in tree. Clutch 3–4 (1–7). Incubation 31–34 days. Fledging c43–46 days, with dependence for 4–6 weeks.

**POPULATION** Relatively few data. In one area of high density in Tasmanian stronghold, creekside nests averaged 2 km apart. Favoured feeding areas of long grass in Victoria showed autumn and winter densities of 1 bird/0.8–1.7 km<sup>2</sup>. Commonest raptor in New Zealand: at one North Island locality, 1 breeding pair/120 ha and 1 bird/80 ha in non-breeding season. In Pacific islands, generally regarded as common. Total breeding range covers around 1.6 million km<sup>2</sup>, but distribution obviously dependent on often local and patchy wetlands. Population likely to be in order of tens of thousands. Nests are vulnerable to human disturbance and the birds are occasionally shot, while drainage of wetlands, or alterations in character or human usage, must remain long-term threat.

**GEOGRAPHICAL VARIATION** Complicated. Sometimes now treated as monotypic species, or as form(s)

of one cosmopolitan marsh harrier *C. aeruginosus* [100], but traditionally two races (and variations among endemic populations of Pacific islands could argue for further division).

*C. a. approximans* (New Caledonia to Fiji and Tonga, introduced Society Islands)

*C. a. gouldi* (Australia, Tasmania, New Zealand) Slightly darker above, more heavily streaked below.

*C. a. spilothorax* (central and eastern New Guinea) Also treated as conspecific here. Male strikingly black, white and grey, but female and juvenile rather similar to *gouldi* (see 'Flight'). Despite wide geographical separation, this 'Papuan Harrier' usually allied with *spilonotus*, the eastern Asiatic race or allo-species of Northern Marsh Harrier, because of some similarities between the males, but we see other similarities to *approximans* and suspect that a single gene may be responsible for convergence with *spilonotus*.

The only alternative, apart from lumping all the marsh harriers, is to treat *spilothorax* as a distinct species.

**MEASUREMENTS** *C. a. approximans* ♂ wing 392–415 mm, ♀ 418–430 mm. *C. a. gouldi* ♂ wing 367–426 mm, ♀ 400–455 mm; ♂ tail 207–250 mm, ♀ 215–263 mm; ♂♀ tarsus 87–105 mm. *C. a. spilothorax* ♂ wing 380 mm. **Weights** ♂ 392–726 g, ♀ 622 g–1.1 kg. *C. a. gouldi* ♂ 520–740 g, ♀ 700 g–1.1 kg.

**REFERENCES** Amadon & Bull (1988), Baker-Gabb (1978, 1979, 1981a, b, 1982a, b, 1983, 1984a, 1985b, 1986, 1993), Beehler *et al.* (1986), Blakers *et al.* (1984), Bregulla (1992), Coates (1985), Copper & Copper (1981), Gosper (1994), Gurr (1968), Hedley (1976), Hollands (1984), Mackay (1991), Marchant & Higgins (1993), Moss (1991), Newgrain *et al.* (1993b), Olsen & Marples (1993), Olsen *et al.* (1993a/b), Pierce & Maloney (1989), Pratt *et al.* (1987), Schodde & Tidemann (1988), Tollan (1988).

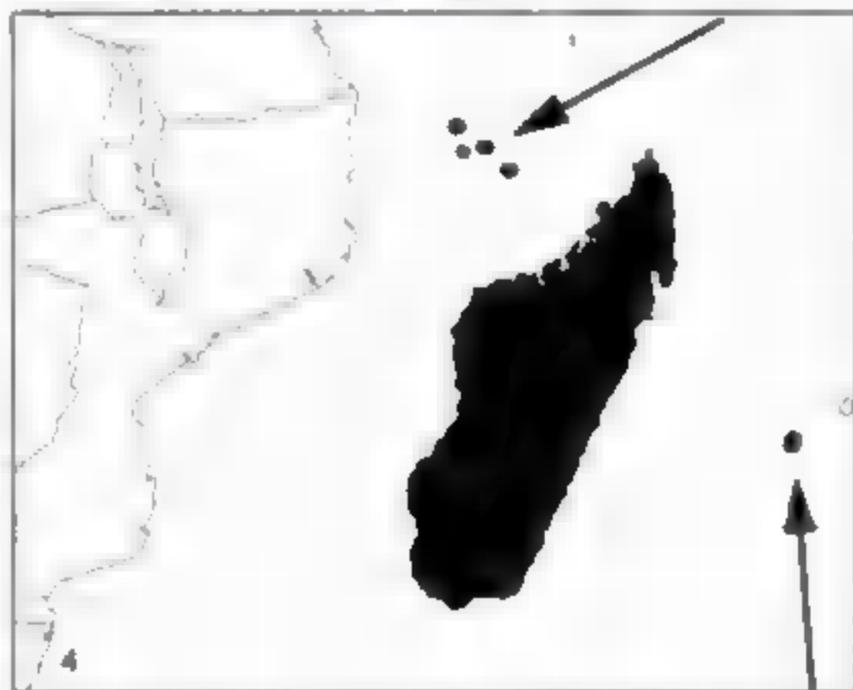
## 102 MALAGASY MARSH HARRIER

### *Circus maillardi* Verreaux, 1863

Plate 30

Other names: Madagascar (Marsh) Harrier, Réunion (Marsh) Harrier

**DISTRIBUTION** Madagascar (11°S to 22°S, perhaps to 25°S); order 4 (order 3 on Réunion alone); generally thinly spread and often surprisingly rare in Madagascar itself, but on some small islands fairly common. Endemic to Comoros and mainly northern three-quarters of Madagascar (where found particularly to west of main ridge), though recent maps (IIBW, BirdLife International) show its covering the whole island; also traditionally Réunion, though that taxon sufficiently different to be treated as distinct endemic species (see Geographical Variation and Simmons 2000).



**MOVEMENTS** Apparently sedentary, though juveniles probably wander. On Réunion, some movement to lower levels during non-breeding season.

**HABITAT** In Madagascar, marshland, lakes with emergent vegetation, ricefields, damp and dry grasslands, also hunting over crops. In Comoros and Réunion, mainly above 500 m in forested highlands with clearings and ravines above sugar-cultivation zone (coming down to

lower levels in wooded ravines), visiting sugar fields for lizards and mice after cane cut. Sea-level to 3,000 m, but rarely above 2,000 m.

**FIELD CHARACTERS** Large harrier, similar in size and shape to Northern counterpart [100], so among bulkiest and largest of harriers, with black/brown, white and grey plumage variably streaked on head and below (but distinctive Réunion form significantly smaller, with more marked RSD and simplification of male plumage; see Geographical Variation); slim head and body, owl-like ruff, longish narrow tail. Spends much of day on ground or low perches; wing-tips clearly short of tail-tip. Sexes very different and female 0–13% larger (3–15% on Réunion); juvenile separable; moults into intermediate immature plumage during first year, then to adult in second. **PERCHED Adult male** Mainly black above and white below, with boldly black-streaked white head down to upper mantle and breast, white rump, and grey secondaries and tail with obscure brown barring. **Adult female** Similar pattern, with clearer white rump, but predominantly brown to grey-brown above, more barred on wings and tail, and more rufous streaks on whitish head and underparts. **Juvenile** Like adult female, but browner above, no suggestion of grey on wings, white rump partly obscured by brown mottling. **Bare parts** Adult eyes yellow (male paler), juvenile dark brown. Cere and feet yellow. **FLIGHT** Mid-sized raptor with thin head, longish narrow wings with parallel edges and rounded tips (shorter and more rounded on Réunion; see Geographical Variation), longish narrow tail; wingspan 2.5 times total length (2.4 on Réunion). Rather laboured beats interspersed with glides on wings in shallow V (like all harriers) and angled forward at carpal joints, legs often dangling; soars with wings raised. **Adult male** Above, looks black and grey with streaky head and mantle, white rump, somewhat obscure barring on grey flight-feathers and tail (strongest along tips of greater coverts and subterminal trailing edges); below, mainly white with streaked head and breast, black wing-tips, dusky subterminal trailing edges.

**MEASUREMENTS** *C. m. maillardi* ♂ wing 340–360 mm, ♀ 370–390 mm; ♂ tail 218–230 mm, ♀ 230–240 mm; ♂♀ tarsus 78–90 mm. *C. m. macroryctes* ♂ wing 392–426 mm, ♀ 424–444 mm. **Weights** No data.

**REFERENCES** Barré & Barau (1982), Benson (1960), BirdLife International (2000), Bretagnolle *et al.* (2000), Cheke (1987)

in Diamond (1987), Clouet (1976, 1978), Collar & Stuart (1985), Dee (1986), Diamond (1987), Horne (1987) in Diamond (1987), Jakubek *et al.* (1997), Jones (1989), Langrand (1990), Langrand & Meyburg (1984), Louette (1988), Macdonald *et al.* (1991), Malcolm (1970), Milon *et al.* (1973), Morris & Hawkins (1998), Simmons (1991a, 2000), Staub (1976), Thibault & Givot (1988).

## 103 LONG-WINGED HARRIER

### *Circus buffoni* (Gmelin, 1788)

Plate 29

**DISTRIBUTION** Neotropical (12°N to 41°S, wandering to 53°S); order 5; local in north, commoner and more widespread farther south. South America: breeds east-central Colombia (Arauca, Meta), north and east Venezuela and Guianas, also Trinidad, and from east and, more particularly, south Brazil through northeast Bolivia (Beni, Santa Cruz), Paraguay and Uruguay to at least Río Negro and possibly still farther south in Argentina; has been assumed to nest central Chile, but individuals there probably only trans-Andean wanderers (see below).



**MOVEMENTS** Sedentary, nomadic and migratory. Most in Surinam throughout year considered to be migrants, and numbers increase in whole north of range during austral winter, April–September, but some remain in central Argentina then and others wander south to Tierra del Fuego in at least autumn; recently found also in Falklands [Islas Malvinas]. Although recorded December–August in Trinidad, where uncommon breeder, some at least thought to range from there to mainland. That wanderers may cross Andes indicated by records in west Colombia (Valle) and Chile (Valparaíso to Maule, and Magallanes).

**HABITAT** Extensive marshes or small lagoons with tall emergent vegetation, also ricefields, wet grasslands; often hunts over, and possibly nests in, wheat and other open cultivation. Sea-level to 1,000 m, mainly below 700 m, but one record at 2,000 m in Andes.

**FIELD CHARACTERS** Much variation in size, but largest individuals are biggest of all harriers, though by no means bulkiest, being particularly slender and lanky; very dark above and dark or pale below, with relatively heavy-looking bill, owl-like face pattern, clearly outlined facial ruff, long wings and longish legs, but not especially long tail. Settles mainly on ground, sometimes in open, and comparatively little on posts or bushes; wing-tips nearly reach end of tail. Polymorphic, mainly as pale and dark morphs, latter more variable. Sexes very similar (much more so than in most harriers), and female averages only 4% larger (though largest may be 30% bigger than smallest male); juvenile also rather similar (particularly pale morph), but readily separable; much as adult after completion of first moult, but some juvenile flight feathers retained well into second-year.

**PERCHED** **Pale-morph adult male** Slaty-black above and across chest, this colour isolating white forehead, supercilia, forecheeks and throat around more or less black-ringed eyes; clear arc of short white streaks emphasises facial disc; greater coverts, flight-feathers and white-tipped tail show much silvery-grey, variously barred or banded with black; breast and abdomen white with few isolated blackish spots, mainly on flanks. **Pale-morph adult female** Very similar in pattern, but black areas browner, usually few more streaks below, grey on quills often (not always) less silvery, and face and underparts may be tinged creamy-buff, thighs often tawnier. **Dark-morph adult** Largely sooty-black, or dark chestnut, or slightly browner below and shading to more chestnut thighs and sometimes also vent (females?), but still silvery-grey on barred flight-feathers and tail, and at least indication of characteristic white or buff face pattern.

**Pale-morph juvenile** Not unlike pale female, but shows bright cinnamon collar arching up on to rear crown; still browner above with white-edged wing-coverts, much duller grey-brown on flight-feathers and tail; creamy-buff below, still with distinctive face pattern and dark chest-band, but browner streaking very variable in extent, sometimes restricted to breast sides. **Dark-morph juvenile** Quills as pale juvenile, but otherwise mainly blackish-brown above, edged rufous, and variably streaked below apart from tawny-rufous thighs and crissum. **Bare parts** Adult male eyes yellow, female tawny-brown (turning yellow when older?), juvenile brown, immature male yellow-brown. Adult cere blue-grey, juvenile grey-brown, immature male greenish-yellow. Legs pale orange-yellow to yellow or bright orange-yellow.

**FLIGHT** Medium-largish but lightly built and lanky-looking raptor with noticeably long wings (these not narrow either, particularly at bases) and longish tail;

## Accipitridae (I: chanting-goshawks)

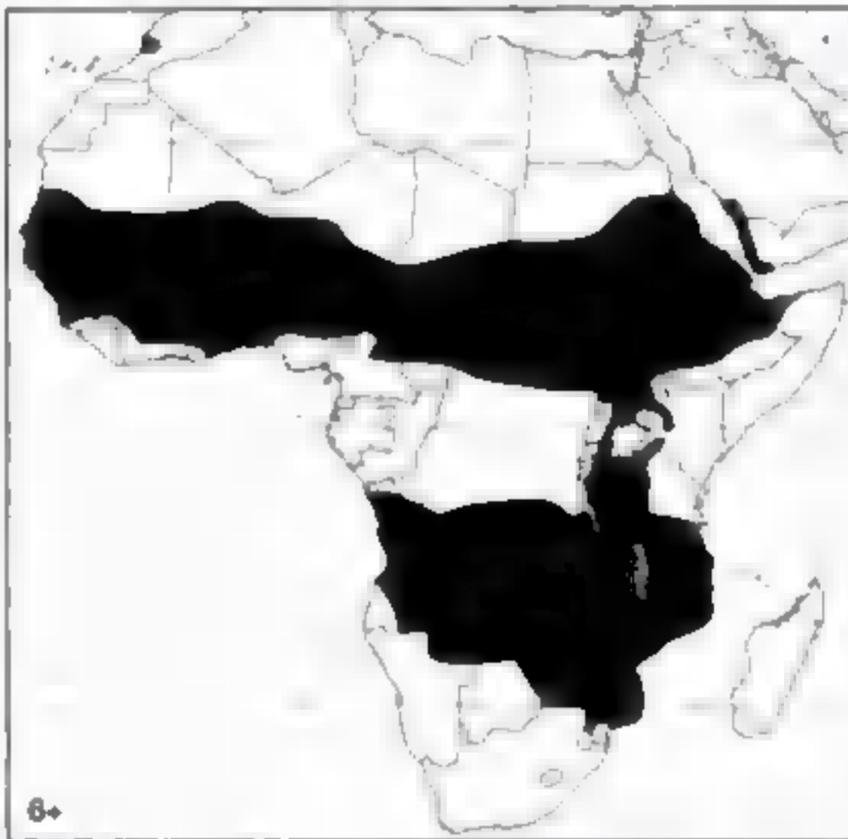
### 104 DARK CHANTING-GOSHAWK

*Melierax metabates* Heuglin, 1861

Plate 34

Other name: Chanting Goshawk (northern range)

**DISTRIBUTION** Afrotropical and marginally Palearctic (31°N to 29°S); order 6+; locally scarce, even rare, particularly outside tropical Africa, but in general quite common. Main range sub-Saharan Africa: Senegambia and southern Mali through central parts of Niger, Chad and Sudan to western Ethiopia and Kenya, then southwards, except in forest and many arid areas, to Angola, north-east Namibia, north Botswana, Zimbabwe, Mozambique, northeastern South Africa and east Swaziland; also coastal southwest Saudi Arabia and Yemen, and Morocco (isolated and presumably relict population in Forest of Marmora and western foothills of High Atlas and Anti-Atlas).



**MOVEMENTS** Generally sedentary, but some dispersion or nomadism suggested by isolated records in Israel and, farther south in Morocco as well as in certain dry areas of East Africa; and regular partial migration indicated in West Africa by southward movements in dry season and north in rains, and in eastern South Africa by northward movements in austral winter.

**HABITAT** Timbered and bushed country with open ground, from thornbush, or even subdesert wadis with few trees, through wooded grassland, savannah and sparse forest-steppe to open woodland and, locally, gallery and other taller broadleaf edge. Generally (but not entirely) in less arid and more timbered country than Eastern and Pale Chanting-goshawks [105, 106] and, where it meets their ranges, confined to richer areas of higher rainfall. Often near human settlements. Sea-level to 3,000 m.

**FIELD CHARACTERS** Medium-sized, bulky hawk of upright stance on long thin legs, grey, black and barred as adult and something like large accipiter at first sight, but very different in character with more overt

behaviour and relatively longer wings and shorter tail. Perches very upright and often in full view on dead branches or tops of trees, but in heat of day may be well inside canopy; also stands on termite mounds, posts and telegraph poles, and walks and runs easily; wings reach over halfway down slightly rounded tail. Sexes similar, but female averages over 5% larger in size and perhaps 25% more in weight; juvenile distinct; moults direct into adult plumage at end of first year.

**PERCHED Adult** Basically dark grey on head to chest and upperparts; white abdomen, thighs and rump all neatly and closely barred blackish; blackish primaries and tail, latter tipped and side-banded white; obvious orange-red bill-base and legs. In northern populations, larger wing-coverts and secondaries finely vermiculated with white, but this feature absent farther south; geographical differences also in tone of grey areas and redness of bare parts (see Geographical Variation). **Juvenile** Dark to darkish brown above (again varying from dark brown in north to greyer-brown in south) with pale-edged wing-coverts, more obviously pale rump barred brown and white, and obscurely dark-banded tail; bill supercilia, streaky white throat and well-defined but streaky brown gorget; abdomen and thighs barred brown and white, more broadly and less boldly than adult; eyes yellow and feet dull orange, but cere brownish. Moults from juvenile to adult plumage results in sharply contrasting mix of brown and grey feathers; bare parts coloured before full plumage gained. **Bare parts** Adult eyes dark red-brown, juvenile pale yellow-brown to yellow. Adult cere, bill-base and feet orange or orange-red (in north) through pinkish-red (in east) to red (in south); juvenile cere brownish-yellow to dull yellow, legs dull yellow to orange-yellow. **FLIGHT** Smallish to mid-sized raptor with broad, rounded, rather straight-edged wings and longish, slightly rounded tail; wingspan 2.1 times total length. Seen relatively little in sustained flight, usually only from perch to perch with fast shallow beats interspersed with flat glides, quite low with final upward swoop, or catching prey by gliding down to ground, sometimes on raised wings. But much faster beats when chasing birds; and at other times much slower, with either rigid mechanical or deep elastic action (see Sociossexual Behaviour). Soars in display with wings held in marked dihedral. **Adult** Looks largely grey apart from blackish wing-ends, black tail (tipped and edge-banded white above, and banded white below), and pale rump; wing-linings are closely barred like abdomen, but both look all greyish at any distance; in northern populations inner parts of upperwings paler (due to white vermiculations), but not so in southern Africa; orange-red bill-base and legs often conspicuous. **Juvenile** Looks mainly darkish brown with barred wing-tips (secondaries also obscurely barred), banded tail and more obviously barred paler rump and underparts, including wing-linings like abdomen.

**CONFUSION SPECIES** Most other African raptors with

coverts; white of abdomen and thighs again neatly and closely barred with grey, but rump and longer undertail-coverts plain white; blackish primaries and tail, latter with more obvious white at sides, contrasting more with the paler upperparts; bill-base and feet rich red. **Juvenile** Also very like juvenile Dark Chanting-goshawk: richer brown above, still with pale-edged wing-coverts, but secondaries plainer except for buff tips, and white rump more speckled than barred; again obscurely dark-banded tail; similar buff supercilia and streaky white throat, but rather less clearly barred abdomen, and paler and more streaked or blotched chest; eyes clear pale yellow, feet dull orange-yellow. Moulting from juvenile to adult plumage similarly results in sharply contrasting mix of brown and grey feathers; bare parts coloured before full plumage gained. **Bare parts** Adult eyes dark red-brown, juvenile pale yellow. Adult cere and bill-base red, juvenile blackish, turning orange. Adult legs red, juvenile orange-yellow. **FLIGHT** Smallish to mid-sized raptor with shape and flight actions as Dark Chanting-goshawk, but plumage quite distinct; wingspan 2.0 times total length. **Adult** Looks even paler in flight than perched, with contrasting black wing-ends and white-edged black tail, because of largely white secondaries and wing-linings, and obvious clear white rump; wing-linings faintly barred, but much less so than abdomen; red bill-base and legs often conspicuous. **Juvenile** Mainly brown (but paler than Dark Chanting-goshawk), more or less barred on abdomen, with blotchy chest, barred flight-feathers and banded tail, but clearer whiter rump and paler primaries with more contrasting dark tips.

**CONFUSION SPECIES** See discussion under Dark Chanting-goshawk [104] (where also brief reference to other grey-and-banded African raptors). Contrasting pale grey and white wings with black tips might briefly recall male Pallid Harrier [96] (October–April only), but harrier flight, slim wings with black-wedged tips, grey rump and tail and white underparts all quite distinct. As Eastern Chanting-goshawk [105] separated from Pale by over 1,200 km occupied by Dark, latter presents only serious risk of confusion. Aridity of habitat can give only general guidance, but adult Dark Chanting-goshawk smaller, shorter-legged and uniformly darker, with plain secondaries and wing-coverts (southern Africa only), less contrasting black wing-tips and tail, and barred rump. Juveniles more difficult, but Dark Chanting-goshawk darker brown, with more clearly defined gorget, more barred rump and, in flight, less contrast below between bases and tips of primaries.

**VOICE** Largely silent except in breeding season, when loud melodious 'chanting' corresponding to that described for Dark Chanting-goshawk [104], perched or in flight by one or both sexes, in comparable series of up to dozen notes often repeated for long periods: this tends to be described as more piping, and written as *kleeu-kleeu-kleeu-klu-klu-klu...*, accelerating and becoming tremulous towards end 'like a spinning plate coming to a standstill', but not clear how much this differs from Dark or, indeed, Eastern Chanting-goshawk [105]. Musical *chee-chit chee-chit...* in flight, with exaggerated shallow beats, may be courtship. Other sounds appear to overlap those for Eastern Chanting-goshawk, which may or may not be due to their formerly being regarded as conspecific.

**FOOD** Probably much as Dark and Eastern Chanting-goshawks [104, 105]: most commonly lizards and rodents; also snakes, insects (dung-beetles, grasshoppers, termites), birds and other small mammals (hares), even small tortoises. Recorded bird kills up to size of small bustard, Spotted Eagle-owl *Bubo africanus*, and once Common Kestrel [277] that had stunned itself; also homestead chickens. Carrion (particularly roadkills) is regular food source. Like other chanting-goshawks, largely still-hunts from perch, slanting down to catch prey on ground, but in its open arid habitats this species often runs after insect and rodent prey. Follows foraging honey-badgers *Mellivora capensis* and slender mongooses *Galerella sanguinea* for hours, both in flight and on foot, even waiting on ground beside them as they dig, to pounce on any small animals they disturb. Some birds (quail, plover) have been caught in flight, and one record of piracy from kestrel.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, but in some areas trios formed by second males attending nests. Patterns of chanting, soaring, chasing and courtship-feeding generally similar to those described for Dark Chanting-goshawk [104]. Possible courtship flight described under Voice above.

**BREEDING** June–March (mostly July–January). Small to largish nest of thin sticks, c40 cm across, varying from shallow platform to c25 cm deep, variously lined with dung, rags, mud, clods, grass, hair, skin and sometimes thick pad of wool; at 2.5–9 m in vertical fork inside canopy, or hidden among creeper at top of thorny tree or, in treeless areas, on utility pole. Clutch 1–2. Incubation 35–38 days. Fledging 44–56 days.

**POPULATION** Few data on densities, but in Namibia home ranges of 5.4–6.7 km<sup>2</sup>. Distribution covers over 2 million km<sup>2</sup> and, even if only at half estimated density of Eastern Chanting-Goshawk [105], total population still likely to be in six to seven figures. Numbers probably generally stable, except where bush being cleared for subsistence agriculture or firewood.

**GEOGRAPHICAL VARIATION** Monotypic. Population of desert and drier steppe from northern South Africa northwest through Botswana and Namibia to southwest Angola has been separated as '*argenteus*', but differences are slight and seem best regarded as cline of increasing paleness towards northwest. See under Eastern Chanting-goshawk [105] regarding taxonomic separation of that species from this: here they and Dark [104] are treated as allospecies forming a superspecies.

**MEASUREMENTS** ♂ wing 328–346 mm, ♀ 360–392 mm; ♂♀ tail 228–268 mm, tarsus 84–100 mm. **Weights** Unsexed 493–1000 g (245, with average of 746 g, and estimated ranges probably 493–750 g for ♂, 700 g–1 kg for ♀); ♀ up to 1.3 kg.

**REFERENCES** Allan (1988b), Biggs *et al.* (1979, 1984), Brown *et al.* (1982), Ginn *et al.* (1989), Guy (1971), Kemp & Kemp (1998), Mackworth-Præd & Grant (1957–73, 1962), Malan (1992), Malan & Branch (1992), Penzhorn (1976), Pickford *et al.* (1989), Pinto (1963), Smeenk & Smeenk-Enserink (1975), Steyn (1973, 1982), Steyn & Meyburg (1992), Wyndham (1937).

## Accipitridae (m: Gabar Goshawk)

### 107 GABAR GOSHAWK

*Micronisus gabar* (Daudin, 1800)

Plate 34

**DISTRIBUTION** Afrotropical (18°N to 34°S); order 6+; widespread and locally common, but often overlooked and under-recorded. Much of sub-Saharan Africa, and southwest Arabia; southern Mauritania and Senegambia through southern Mali, Niger, Chad and central Sudan to Ethiopia and western Somalia, and thence southwards, except in wetter forest, to all of southern Africa bar extreme southwestern South Africa; also southwest Saudi Arabia and Yemen.



**MOVEMENTS** Generally regarded as largely sedentary, but immatures more nomadic or dispersive. One male ringed in second half of first year moved 288 km in 19 months. A regular northward migration through Tatu Desert of southeast Kenya in January–March coincides with similar movement by Eastern Chanting-goshawk [105]. Some evidence of north-south movements in West Africa, too, with populations increased by influxes in rainy season, June–October, but in Gambia and Ivory Coast appears to be non-breeding visitor in dry season, November–May. Presumed resident in southwest Arabia.

**HABITAT** Thornbush, wooded savannah, and other open woodland, mainly in areas of low rainfall with tall trees; locally extends along watercourses into subdesert scrub. Some evidence of colonising built-up areas (e.g. Gaborone, southeast Botswana), but usually avoids exotic plantations. Sea-level to 2,000 m.

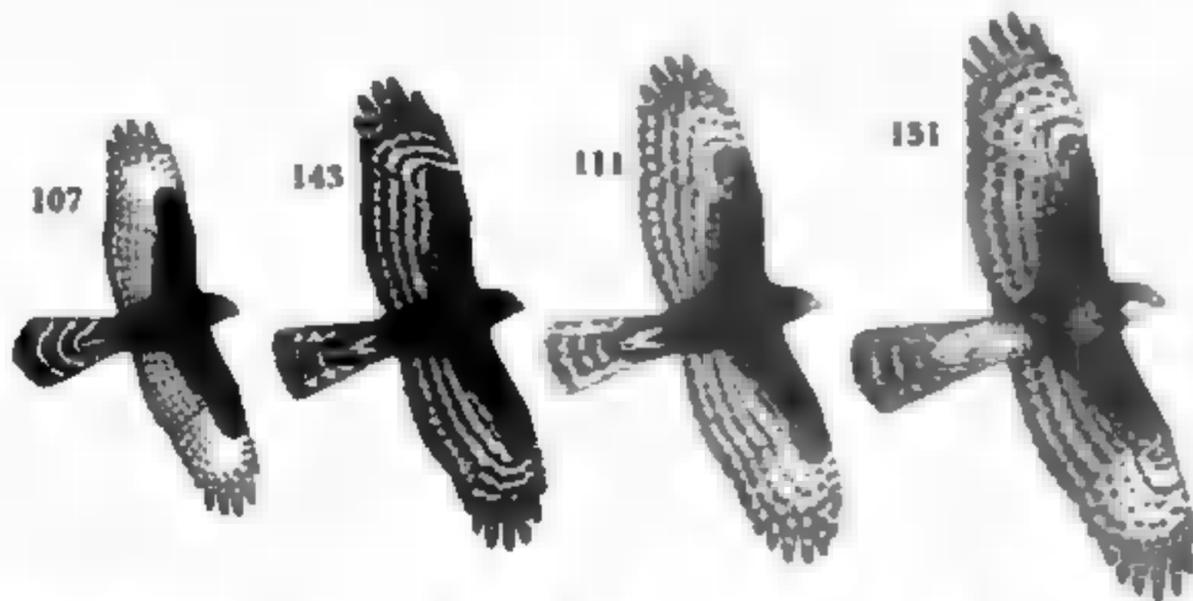
**FIELD CHARACTERS** Smallish accipitrine hawk, as adult either all dark or largely grey above and barred on belly, superficially resembling tiny chanting-goshawk [104–106] and often still placed in same genus, but very different in behaviour, moult, voice, and other aspects. Sparrowhawk-like, secretive and perching inside canopy; short wings reach only about one-quarter down longish rounded tail. Dimorphic (intermediates very rare). Sexes similar, but female clearly larger (despite averaging only 6% more in wing length), with constantly bigger body, longer tail and tarsus, and around 90% more in

weight; juvenile distinct; moults direct into adult plumage at end of first year. **Pale-morph adult** Grey upperparts, head and chest, but for white rump and bar along tips of grey-brown secondaries; white abdomen and thighs finely barred grey, but plain undertail-coverts; and banded tail, which is grey-brown above with three dark bands, broader subterminal, and white tip, but more extensively white below because of graduated tips; bare parts reddish. **Dark-morph adult** All black (no white rump) but for three thin tail-bars (grey above and white below); again reddish bare parts. **Pale-morph juvenile** White rump and four-banded tail, but otherwise brown above with streaky head, buff-edged wing-coverts, and two white wing-bars (white-tipped greater coverts and secondaries); and buffish-white below with red-brown streaks on chest and bars on abdomen and thighs; bare parts yellow. (Some immatures are whiter below with dark brown streaks and bars, and there is much individual variation in shade of brown.) **Dark-morph juvenile** Largely brownish-black, much like adult but for bare parts. **Bare parts** Adult eyes dark red-brown, juvenile grey at first, turning yellow then orange. Adult cere and legs red (latter variably spotted with black on melanistic morph), juvenile cere dark grey, turning yellow, and legs pale orange.

**FLIGHT** Small raptor with shape and actions very like accipiter: short rounded wings and longish rounded tail; wingspan 1.9 times total length. Usually seen only dashing from one tree to next, or in fast flight after bird prey; glides on flat wings, seldom soars. **Pale-morph adult** Grey above and barred below, but for white rump, white-tipped banded tail, grey head and completely barred underwings; red cere often visible. **Dark-morph adult** Mostly black, including rump and wing-linings, but contrasting flight-feathers white below with blackish bars (pale windows showing through at bases of primaries above), and three clear white tail-bars (thin and rather inconspicuous above); red cere often visible. (See fig. 37.)

**Pale-morph juvenile** Brown and buff-white, and best distinguished by combination of white rump, streaked chest and barred abdomen. **Dark-morph juvenile** Very like dark adult but for yellow bare parts.

**CONFUSION SPECIES** Most other African raptors with grey chest and barred abdomen are much larger (see mentions under Dark Chanting-goshawk [104]); exception is Lizard-buzzard [163], which even also has white rump and reddish bare parts, but is really quite different, being open-perching, stocky, with black median stripe on white throat and single white band on black tail. Otherwise pale-morph Gabar's combination of grey breast, white rump, and red cere and legs diagnostic of adults. Nevertheless, on shape and character, confusion still possible with certain accipiters. Oyambo Sparrowhawk [143], usually quite distinct through small snake-like head, longer wings, barred rump, uniformly marked underparts (not mixture of grey and barred or streaked and barred) and orange-yellow cere and legs, has rather



**Fig. 37.** Dark morphs of four Afrotropical accipitrines (first three the larger females, fourth the smaller male). Gabar Goshawk *Micronisus gabar* [107]: black body and wing-linings; finely-banded white flight-feathers, relatively pointed wings; very rounded black tail with clear white bands. Ovambo Sparrowhawk *Accipiter ovampensis* [143]: dark grey body and linings; broadly banded flight-feathers, relatively long long-tipped wings; squarish tail. African Goshawk *A. tachiro* [111]: black body and linings; finely banded flight-feathers, relatively short rounded wings; slightly rounded tail. Great Sparrowhawk *A. melanoleucus* [151] (dark morph in east and south of range); mainly black body and linings, but always some white on throat, usually white edgings on breast and belly, more on crissum; dark-banded whitish flight-feathers, broad rounded wings; longish tail obscurely marked and somewhat rounded.

similar melanistic morph, but with tail and undersides of flight-feathers more broadly banded grey and black (no windows showing through above) and orange-yellow cere and legs. Little Sparrowhawk [135] does have thin white rump, but is tiny, with distinctive spotted tail pattern, white throat, barred underparts, and yellow cere and legs; juvenile with blotchy breast and rump quite different. Shikra [113] is all grey and barred (adult) or brown and blotched with short whitish supercilia (juvenile), always with obvious yellow cere.

**VOICE** Silent except when breeding. Then fast high-pitched *kee-kee-kee-kee...* used, with variations, by either sex in contexts of courtship, contact and defence, mainly when perched or moving on branches, but piping *keu-keu-keu-keu* may be more territorial.

**FOOD** Mainly birds; occasional small mammals (e.g. mice) and reptiles (lizards, snakes), some insects. Birds mostly to size of pipits *Anthus*, weavers (Ploceidae), starlings (Sturnidae) and barbets (Capitonidae), but largest prey records include coucals *Centropus* and francolins *Francolinus* of similar or even greater weights than the predator; regularly robs nests (especially weaver colonies) and often takes nidifugous young (e.g. francolins). Bird prey often flushed during foraging flights, often in pairs, among trees and then caught during fast and frequently persistent chases (victims even followed into cover on foot). Hunting birds sometimes accompanied by Red-headed Falcon [288]. But also still-hunts from perch within canopy, either dropping on to ground prey or again chasing passing birds. Regularly takes nestlings, particularly those of sociable and colonial species whose activities and noise draw attention: opens way into enclosed nests through their roof and even hangs flapping from pendent weaver nests.

**SOCIOSEXUAL BEHAVIOUR** Solitary or often in pairs. Soars calling in aerial display, and male chases female through trees. He also calls frequently from perches early in breeding season and when bringing food to mate.

**BREEDING** March–August in Nigeria across to Somalia, mainly September–December (but possible almost year-

round) in East Africa, August–November in Zambia, and mainly September–January (but possible August–March) in southern Africa. Nest is a small platform of thin sticks 25–30 cm across and 10–15 cm deep, lined with finer twigs, not leaves but sometimes earth or rags; often inbuilt with nests of colonial spiders that subsequently spread webs over whole structure (providing camouflage?); at 5–12 m (3–25 m) in vertical fork in crown of generally thorny tree, especially mature acacia. Clutch usually 2 (1–4). Incubation 33–35 days. Fledging 30–35 days.

**POPULATION** Easily overlooked, and no detailed information, apart from inter-nest distances of 4.3–5.8 km in Namibia. Numbers probably generally stable, except where woodland and bush being cleared for subsistence agriculture or firewood. Vast breeding range extends over more than 12 million km<sup>2</sup> in diverse variety of savannah, thornbush and woodland habitats, and, though rarely using exotic plantations (particularly in Southern Africa), the species is possibly able to adapt to urbanised surroundings. Total population must surely be at the upper end of the hundreds of thousands range.

**GEOGRAPHICAL VARIATION** Monotypic. Dimorphic, with regional, local or ecological variations in proportions of morphs; often stated that black individuals account for up to 25%, but in some areas of East Africa numbers of the two morphs are considered similar, and in northeastern South Africa only 6.5% of 216 proved to be black.

**MEASUREMENTS** ♂ wing 175–204 mm, ♀ 186–215 mm; ♂ tail 150–165 mm, ♀ 170–185 mm; ♂ tarsus 42–50 mm, ♀ 51–54 mm. **Weights** ♂ 90–173, ♀ 167–240 g.

**REFERENCES** Batchelor (1980), Benson & Benson (1975), Biggs *et al.* (1979), Black & Ross (1970), Brown (1986a), Brown *et al.* (1982), Clancy (1987a), Colebrook-Robjent (1986), Gann *et al.* (1989), Grimes (1987), Henschel *et al.* (1991), Herholdt (1994), Kemp (1986, 1988), Kemp & Kemp (1976, 1998), Kemp & Snelling (1973), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957–73), Maclean (1993), McGrew (1980), Pickford *et al.* (1989), Pinto (1985), Rasa (1987), Simons (1986a), Smeenk & Smeenk-Enserink (1975), Steyn (1982, 1992), Tarboton & Allan (1984), Thiollay (1978c), van Someren (1956) Zimmerman *et al.* (1996).

## Accipitridae (n: true accipiters)

With at least 47 species (as treated here), and possibly as many as 54 (if the more obvious possible splits be followed), the 'sparrowhawks' and 'goshawks' of *Accipiter* make up easily the largest single genus in the varied complex of 78 genera of seven families and four orders that comprise what we term 'raptors'. (Only the 39 true falcons of *Falco* and the 28 buzzards or broad-winged hawks of *Buteo* form genera anywhere near as large.) Five other small and rather specialised genera, totalling a further eight species, that are apparently allied to, or convergent with, the accipiters – *Melierax* [104–106], *Micronisus* [107], *Erythrotriorchis* [155–156], *Megatriorchis* [157] and *Urotriorchis* [158] – combine to form the accipitrine group.

The true accipiters are typical of forest, woodland, thorn shrub and other more or less well vegetated zones almost throughout the inhabited world. Many archipelagos or even individual islands, especially in the eastern tropics, have one or more endemic species. (No accipiter is found in New Zealand, but there are endemics in New Caledonia and Fiji to the north.) All accipiters nest exclusively in trees (rarely on the ground). Many are essentially bird-eaters and some of these, as might be expected (pp. 35–39), show the greatest RSD of any raptor; others concentrate on insects, amphibians, reptiles, or small mammals, and show much less sexual dimorphism, but still with little overlap in measurements. Varying in size from the males of the South American Tiny Hawk [132] (a specialist feeder on hummingbirds), Little Sparrowhawk [135] and Sulawesi Small Sparrowhawk [138], which are all thrush-sized, to the female of the Northern Goshawk [153], which may be nearly three times as big and up to 20 times as heavy, they tend to fill every feeding niche (sometimes, smaller males and larger females different niches).

It is usually not difficult to recognise accipiters as such, by shape, flight and behaviour – when they can be seen – but most are secretive and inconspicuous, except in high aerial displays, and thus easily overlooked. They are characterised by short rounded wings and longish tails, and in active flight many use a distinctive flap-flap-flap-glide, often quite low over the ground or along forest edges and other interfaces. They rely on surprise to catch their prey: they may wait within foliage on a branch (still-hunting) or move with pauses along a series of often regular perches (perch-hunting); or they may approach a possible food source behind or through cover, then make a short dash at the prey. They seldom attempt to fly down prey in the open, as falcons do, nor do they usually hover, but they will chase birds deep into dense vegetation. Their legs and middle toes tend to be either long and thin (typical of 'sparrowhawks') or shorter and thicker ('goshawks'), though some species do combine long tarsi and short middle toes, depending on their food specialisations.

Much more difficult is the identification of briefly-seen accipiters in areas where two or sometimes several species may be found. The highest concentrations of different accipiters are from the eastern Indomalayan region and Wallacea into New Guinea and other parts of the northern Australasian region through the Solomon Islands; some places have several endemics and, during the northern winter, one or two migrant species as well, so half a dozen accipiters may be found on an island such as New Britain. The position is further complicated by the fact that many accipiter species are di- or polymorphic, and most adults and juveniles are also distinct. (Adults tend to be white or rufous below, and often more or less barred, while juveniles tend to be streaked.)

Although the wings of accipiters are generally short and rounded, and the tails longish, the species of dense forest usually have the shortest wings and longest tails, and those of open woodland the other way round. These differences are quite marked and some indication of the shapes of the individual species can be gauged by the ratios quoted for wingspan over total length, which vary from 1.5 to 2.0. Moreover, we have tried to express in words the results of Dr Jan Wattel's careful diagrams (1973) of the differences in the shapes of the wing-tips of every accipiter: in low or overhead flight, these may help to narrow identifications.

### 108 GREY-BELLIED GOSHAWK

*Accipiter poliogaster* (Temminck, 1824)

Plate 51

Other name: Grey-bellied hawk

**DISTRIBUTION** Neotropical (12°N to 30°S); order 4?; wide scatter of records perhaps at least partly due to migrants and, though little known, species generally regarded as very local and rare. Mostly tropical South America east of Andes, from extreme north and east Colombia, extreme west and south Venezuela (Táchira, south Bolívar), and lowland Guyana and Surinam south through east Ecuador ('widespread' but rare), northeast Peru and Amazonian and east Brazil, south to north and east Bolivia (Pando, Santa Cruz), east Paraguay, extreme northeast Argentina (Misiones, where probably fairly common though much overlooked; M Pearman)

and in southeast Brazil (São Paulo and Paraná, but not Rio Grande do Sul since 1930s); several of these countries, particularly in the north, can muster only handful of records.

**MOVEMENTS** Perhaps migratory, at least to some extent, from south to north and back: for example, in east Paraguay and northeast Argentina, seen mostly during wetter and more humid summer months of November–February (though 6+ austral winter records shown from Misiones); and all the few Colombian records are March–June.

**HABITAT** Lowland tropical forest, humid secondary growth and other dense woodland, also riverine strips. Apparently almost entirely below 500 m.

Titte (1976), Laubmann (1939), Meyburg (1986), Meyer de Schauensee & Phelps (1978) Navas & Bo (1991), Olivares (1950), Olog (1985), Partridge (1961), Remsen & Taylor

(1989), Sick (1993), Snyder (1996), Thiollay (1989a/b), Wartzel (1973).

## 109 CRESTED GOSHAWK

*Accipiter trivirgatus* (Temminck, 1824)

Plate 41

**DISTRIBUTION** Indomalayan (30°N to 9°S); order 5+; widespread and not uncommon, locally even common, over extensive range. India and southeast Asia to western Indonesia and southern Philippines. Sri Lanka, south-west, east and northern India (Western Ghats from Kerala north to north Mysore and Goa, Eastern Ghats north from Godavari river, and Garhwal east to Assam), with southern Nepal (uncommon), south Bhutan(?) and parts of Bangladesh(?), through Burma and east across southern China (south Sichuan, Yunnan, Guangxi, Hainan), also Taiwan, and southward patchily through all countries of mainland southeast Asia to Sumatra (also at least Nias), Java, Bali, Borneo (also at least Natuna Besar), and west and south Philippines (Balabac, Palawan, Calamians, Polillo, Samar, Leyte, Calicoan, Dinagat, Siargao, Mindanao, Bohol, Negros).

**MOVEMENTS** Apparently sedentary, and individuals sometimes found repeatedly in same areas, but some dispersal by juveniles likely and offshore islands may have been colonised through sea crossings.



**HABITAT** Forest, whether evergreen or deciduous, in both humid tropical lowlands and subtropical premontane and montane regions, especially where wooded country interspersed with open areas; often near streams in Nepal; sometimes in secondary growth or around such places as forest villages and cultivation or well-timbered botanic gardens. Mainly sea-level to 1,800 m, but locally to 2,400 m.

**FIELD CHARACTERS** Mid-sized to largish but slim-looking accipiter, as adult both streaked and barred below, with short but often visible pointed crest, heavy bill, short wings, medium-length tail, short sturdy legs and toes. Perches mainly within cover, and so inconspicuous, but not shy and in early mornings may be seen on open tree tops and bare branches; wing-tips hardly exceed

tail-base. Sexes rather similar, but can be distinguished on good view and, if pair together, female usually obviously larger, averaging 8–15% bigger in different races (up to maximum 22%) and probably much heavier; juvenile distinct in pattern, and longer-tailed; as adult after first moult.

**PERCHED Adult male** Widespread mainland race largely dark brown above, but for blackish-slate crown and crest, paler grey head-sides, evenly banded tail and, in fresh plumage, thinly white-tipped uppertail-coverts; basically white below, throat plain apart from bold black median and malar stripes, chest strongly spotted and streaked dark brown or rufous in centre and plain rufous at sides (sometimes right across), abdomen and flanks barred sepia to chestnut, thighs more finely barred blackish, and crissum plain white. (Other races have browner cheeks or greyer head – or, in Java to Philippines, greyish mantle too – as well as less or more rufous chest, which may also be dusky-blotched, and liner, paler, more rufous or much bolder blacker barring on lower breast and belly, but general pattern remains essentially similar; see also Geographical Variation.) **Adult female** Larger; browner on head, often paler on back, less rufous on chest, less neatly and more heavily marked with browner colour below; but single birds need to be seen well to distinguish from male. **Juvenile** Crown and smaller (but often still obvious) crest blackish-brown, edged buff, and cheeks finely streaked; otherwise, paler greyer-brown above with blackish subterminal bands on all feathers as well as, in fresher plumage, thin whitish tips, broadest on uppertail-coverts; tail evenly banded like adult; nearly white on throat (again with dusky median and malar stripes) and crissum (but now dusky-speckled), and otherwise variably cream to pale rufous below with streaks and blotches of black (especially on chest) to brown or dark rufous, except on thighs, where finely barred dark brown. **Bare parts** Adult eyes greenish- to golden-yellow or reddish-orange (apparently some variation between races), juvenile brown, turning yellow. Adult cere greenish-yellow to yellow, juvenile greenish-grey to greenish. Adult legs yellow to orange-yellow, juvenile pale dull yellow. **FLIGHT** Smallish to medium-sized raptor with accipiter proportions (p. 516), but slim build, well protruding head, broad and relatively short wings very round-tipped and slightly pinched in at rear bases, medium-length tail (females larger than most other accipiters of region); wingspan 1.8 times total length. Rapid stiff beats, interspersed with glides on level wings or, in display, held below horizontal; often soars with wings flat or slightly raised, and tail usually well spread. **Adult** Rather uniformly dark above, apart from four even dark brown bands on paler brown tail, but crown may look blacker or head (and, regionally, mantle) greyer; in fresh plumage, thin white bar across tips of uppertail-coverts diagnostic; mainly whitish to buff below, or more rufous

across chest, with black throat-stripe, more or less streaked chest, sparsely spotted wing-linings, barred axillaries to belly, fine-barréd thighs, pure white crissum, and whitish shading to palest grey-brown quills with three visible dark bars on tail and four to five on flight-feathers. **Juvenile** Paler and all obscurely dark-barréd above, with streaky head, four-banded tail like adult, and often boldly white-tipped uppertail-coverts; mainly cream to pale rufous below, with median stripe like adult on whiter throat, variously streaked and blotched with darker rufous or brown on rest of body, only lightly flecked on wing-linings, fine-barréd on thighs, and dusky-speckled on crissum, with less strongly barréd flight-feathers than adult and four visible tail-bars. (In some races, e.g. Sri Lanka, juvenile may be much plainer on rufous underbody and linings, marked only with dark blobs on belly, spots on thighs, and reduced bands on creamier flight-feathers.)

**CONFUSION SPECIES** Some resemblance to similar-sized Jerdon's Baza [11], which has comparable range, but that has longer crest, greyish cere, much longer wings extending well down tail, barréd crissum and, in flight, obviously distinct wing shape, and differently patterned tail, wing-linings and tips to flight-feathers. Crested Goshawk is largest accipiter over much of its range, apart from Northern Goshawk [159] which, like Northern Sparrowhawk [145], is but a rare winter visitor to most of region: apart from lacking the median throat-stripe, both are greyer above and evenly barréd below as adults, respectively neatly tear-dropped and distinctly barréd as juveniles, and proportionately longer-winged. Combination of size, crest, throat-stripe, mix of streaks on chest and bars or blotches on belly, no supercilia behind eyes, and lack of some accipiters' nape-spot, make it one of the easier of this difficult genus to identify: crest is unique and clear median throat-stripe is shared only with obviously smaller Shikra [113] and Besra [137], though Besra also combines streaks on breast and bars on belly.

**VOICE** Usually silent. Shrill scream, *he, he, hehehehe*, in Sri Lanka (Henry) has been variously copied, hyphenated or run into one word by subsequent authors elsewhere. Other descriptions, some of which may relate to same call, include 'shrill prolonged velp', 'hoarse chuckling' and, when defending nest against human intruders, 'loud screams and deep croaks'.

**FOOD** Birds, lizards, small mammals, frogs, large insects, possibly in that order, but race and sex of the goshawk affect prey size and food spectrum. Thus, males in Sri Lanka (among smallest: see Geographical Variation) said to feed only on lizards and small birds, while much larger southeastern Asiatic females(?) can take species as large as green pigeon *Trogon* and various gamebirds (Phasianidae). In general, smaller birds and nidifugous young (e.g. of junglefowl *Gallus*) probably staple diets, along with lizards and such mammals as rats and shrews. Mainly still-hunts from hidden perch, often overlooking glade or track, pouncing down to take prey from forest floor and perhaps trunks and branches. Also recorded dashing after birds and insects in flight and, in Borneo, hawking bats by cave-roosts.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. In

breeding season often soars, calling; displaying male(?) glides or flaps above forest on downcurved or winnowing wings and with white undertail-coverts widely spread.

**BREEDING** March–July from India eastward, but starting February in Sri Lanka and Borneo, January in Sumatra, December in Java. Big stick nest, up to 50 cm across and 30 cm or more deep after repeated use in successive years, lined with green leaves, at 9–45 m in densely foliaged or creeper-hung forest tree, often near stream or pond. Clutch 2 (1–3). Incubation c34 days (Sri Lanka). Fledging period not recorded.

**POPULATION** Probably under-recorded, but often not uncommon over extensive range of at least 4.5 million km<sup>2</sup>. So perhaps reasonable to anticipate high five-figure population, which would be reached by average density of only 1 pair/100 km<sup>2</sup>, but deforestation has greatly reduced this once more widespread species in Philippines, Java, Bali, parts of mainland southeast Asia, and doubtless elsewhere, to 'scarce' status and must be a serious threat through other parts of range.

**GEOGRAPHICAL VARIATION** Eleven races, differing mainly in size but also to some extent in colour tones and strength of barring below. Only *indicus* and *peninsularae* are mainland forms, and the first shows both individual and clinal variation.

*A. t. indicus* (Nepal, northern and east India and south China all through to peninsular Malaysia) One of the two largest.

*A. t. peninsularae* (southwest India) Generally much smaller sex for sex.

The island races, in roughly descending order of size from the northernmost and biggest

*A. t. formosae* (Taiwan) Probably averaging larger even than *indicus*.

*A. t. trivirgatus* (Sumatra)

*A. t. javanicus* (Java, Bali)

*A. t. microstictus* (Borneo)

*A. t. palawanus* (Philippine Balabac to Calamians, possibly also Natuna)

*A. t. castroi* (Philippine Polillo Islands)

*A. t. extimus* (main Philippine range)

*A. t. niasensis* (Nias, off Sumatra)

*A. t. layardi* (Sri Lanka)

In general, though the pattern is geographically rather irregular, the smaller insular races tend to have bolder or more rufous barring below and the easternmost to be greyer on head or nape and mantle (see Mayr for detail). The related Sulawesi Crested Goshawk [110] continues these trends, but is clearly long isolated, with conspicuously different adult plumage, and regarded as a distinct species within the same superspecies.

**MEASUREMENTS** *A. t. indicus* ♂ wing 216–236 mm, ♀ 232–262 mm; ♂ tail 168–195 mm, ♀ 182–213 mm; ♂♀ tarsus 56–59 mm. *A. t. peninsularae* ♂ wing 196–211 mm, ♀ 214–237 mm; ♂ tail 159–168 mm, ♀ 169–180 mm; ♂♀ tarsus 51–57 mm. *A. t. formosae* ♂ wing 231–234 mm (two), ♀ 259–260 mm (two). *A. t. trivirgatus* ♂ wing 197–205 mm, ♀ 217–225 mm. *A. t. javanicus* ♂ wing 189–203 mm, ♀ 208–230 mm; ♂♀ tail 151–173 mm, tarsus 51–57 mm. *A. t. microstictus* ♂ wing 191–200 mm, ♀ 216–217 mm (two). *A. t. palawanus* ♂ wing 189–195 mm, ♀ 219–221 mm. *A. t. castroi* ♂ wing 184–190 mm, tail 148–160

Sulawesi Small [138] and, especially, Vinous-breasted [142]: adults are quite different (black above and unmarked grey and vinous on underbody), while juveniles are strongly rufous above (Spot-tailed and Small more or less plain on back and wings, but Vinous-breasted neatly spotted and barred) and variously rufous-tinged and dark-streaked below; all are also typical sparrowhawks with long thin legs. During October-March two other small sparrowhawks occurring as migrants in Sulawesi, sometimes in flocks, are Japanese [136] and the shorter-legged Chinese [115]: both have longer and more pointed wings and shorter tail; adults are plainish slate above and grey to rufous below; and juveniles have pale supercilia and, respectively, much heavier markings below and conspicuous dark underwing-tips. See further discussions under all these species.

**VOICE** Usually silent. High-pitched and rather faint *beep-tzee-tzee...*, said to be uttered more slowly than calls of many other accipiters.

**FOOD** Lizards, small birds, large insects, small mammals; also domestic chicks from native villages. Still-hunts from hidden perch adjacent to clearing or track; apparently most, if not all, prey surprised on ground by short swoop.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Almost no references to soaring, which must surely form part of breeding behaviour, and no record of other aerial displays.

**BREEDING** Few data. At least May-July, but copulation also noted in July. Only described nest was large stick structure in main fork of rather small tree. No information on clutch size, incubation or fledging.

**POPULATION** Mainland Sulawesi totals some 180,000 km<sup>2</sup> and this easily overlooked species is considered widespread if uncommon. A four-figure breeding population, which, excluding immatures, would require average densities somewhere between 1 pair/360 km<sup>2</sup> and 1 pair/36 km<sup>2</sup>, seems fair assumption for an island which still has extensive forest in central part and nature reserves elsewhere, even though the northern and southern peninsulas are now heavily populated. But forest clearance continues.

**GEOGRAPHICAL VARIATION** Monotypic. Clearly related to Asian Crested Goshawk [109] and used to be considered small race of that species because of similarities in structure, but evidently long isolated: adults quite distinct and 'much more different from all the races of *A. tringoides* than these races are from each other' (Wattel). The two now generally regarded as forming a superspecies.

**MEASUREMENTS** ♂ wing 170-181 mm, ♀ 182-210 mm; ♂ tail 133-147 mm, ♀ 140-165 mm; ♂♀ tarsus 49-56 mm. **Weights** ♂ 212 g (one), ♀ 209 g (one).

**REFERENCES** Bishop *et al.* (1994), Mayr (1949), Mesburg & van Balen (1991), Stresemann (1940a), van Balen (1993), van Bemmelen & Voous (1951), van Marle & Voous (1946), Wattel (1973), White & Bruce (1986).

## 111 AFRICAN GOSHAWK *Accipiter tachiro* (Daudin, 1800)

Plate 37

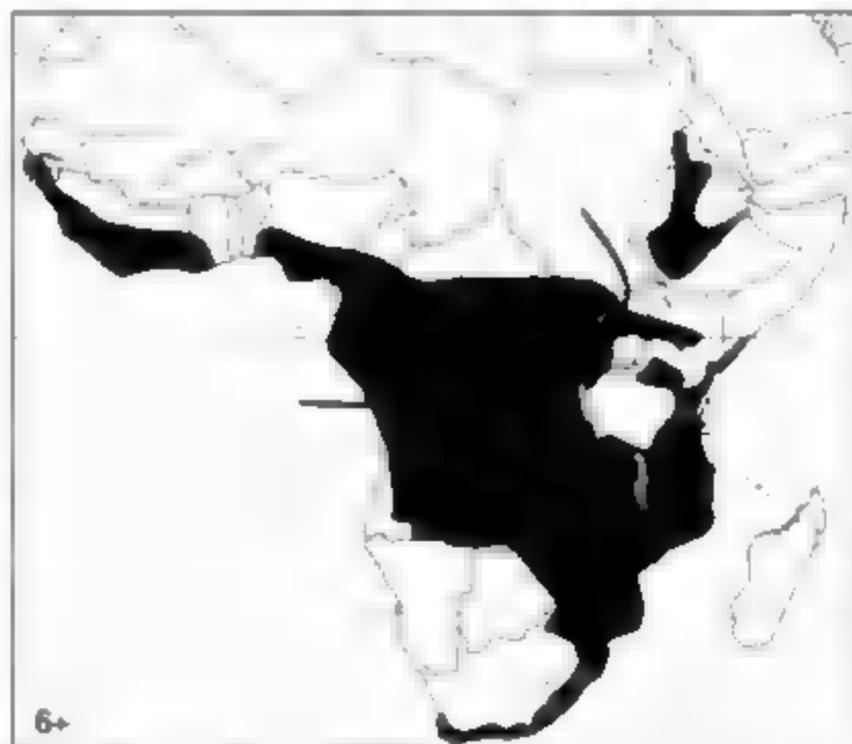
Other names: West African or Red-chested-breasted Goshawk (West and Central African populations combined, or first name applied in Senegambia to west Cameroon and other two in Central Africa only)

**DISTRIBUTION** Afrotropical (16°N to 35°S); order 6+; widespread and common. Endemic to sub-Saharan Africa: Gambia, southern Senegal and Sierra Leone eastwards through West African coastal countries, southern Cameroon, DR Congo, Uganda, Kenya and southern Somalia, north to southeast Sudan and northwest Ethiopia, and south to Angola, northeast Namibia, north Botswana, Zimbabwe, Mozambique and eastern and southern South Africa around to Cape Town area; also Bioko (formerly Fernando Po) in Gulf of Guinea, and East African islands of Pemba, Zanzibar and Mafia. (West and Central African populations sometimes treated as separate species [see Geographical Variation].)

**MOVEMENTS** Considered completely sedentary, but some wandering to more arid habitats during long rains in Kenya, and one vagrant record on Ethiopia/Somalia border; extent of dispersal by young not known.

**HABITAT** Typically forest and rich dense woodland in both lowlands and mountains, but also gallery forest and other riverine woodland, exotic plantations, parkland and large gardens. Populations of southern and eastern Africa occur in both humid and dry forest and some-

times in more isolated patches, while those of Central and West Africa are concentrated more in tropical rainforest to dense secondary growth, but most often by rivers or swamps and even in mangroves. Sea-level to 3,000 m.



**FIELD CHARACTERS** Medium-sized to largish accipiter, as adult mainly dark slate and rufous with or without bars below, with heavy bill, long thick legs and short toes; short rounded wing-tips cover only base of long

Geographical Variation) unusually noisy and conspicuous in aerial displays, especially in mornings and evenings, but West and Central African races said not to perform regular displays above their territories.

**BREEDING** July/August–February in West Africa, almost year-round (particularly March–July and October–February) in Kenya, October–March in southeast DR Congo and Zambia, and September–February in southern Africa. Small to largish structure of sticks and twigs, 40–60 cm across and 15–45 cm deep, lined with green leaves, at 6–20 m in main fork or lateral branch of tall tree, well concealed by foliage or creepers. Clutch 2–3 (1–4). Incubation 28(?)–35+ days. Fledging 32–36 days.

**POPULATION** Generally considered commonest African accipiter (perhaps even belonging in order 7), but no population studies available for assessment of numbers. Deforestation and spread of cultivation have led to loss of habitat, and some decline seems likely, but this species can adapt to plantations, secondary growth, large gardens, and remnant forest islands in open country.

**GEOGRAPHICAL VARIATION** Up to nine races. Considerable variation in size, degree of RSD, colour saturation of underparts, and tail pattern, among both adults and juveniles, so much so that extremes look unlikely to belong to same species. Indeed, southern and eastern group of five races (nominate *tachiro*, *sparsifasciatus*, *crozati*, *unduliventer*, *pembaensis*) often treated as separate species (= *A. tachiro*) from western and central group of four (*toussenelii*, *canescens*, *macroscelides*, *lopezi*) (then = West African or Red-chested/breasted Goshawk *A. toussenelii*); sometimes the last two and westernmost of these four are considered to form a third species (then = West African Goshawk *A. macroscelides*). Further, sexual size differences unusually large, and only one race (*sparsifasciatus* of East Africa from Somalia to Tanzania, thence south of DR Congo's rainforests across to north Angola) known to have dark morph. Much intergradation between these groups, as well as variation within them and similarities between disjunct populations, so

whole complex here treated as one species. The nine described races can be divided into three groups.

(1) *tachiro* group (South Africa north to Angola and southern DR Congo and through East Africa to Ethiopia, also Pemba, Zanibar and Mafia) Brownish-slate above and closely barred below, becoming smaller and darker farther north, with three usually rather inconspicuous white central tail-patches; juvenile brown above, buff-white below with bold blotches and flank-bars.

(2) *toussenelii* group (Congo basin west to Gabon and south Cameroon) Dark grey above with paler head and throat, almost plain rufous and white below, two to three large white patches on blackish tail; juvenile blackish above, white below with relatively few to almost no markings.

(3) *macroscelides* group (West Africa from Senegambia to west Cameroon, also Bioko) Again small and dark above, with greyish throat, underparts mixed barred and plain rufous, and three clear white tail-patches; juvenile blackish-brown above, white below heavily spotted with brown.

**MEASUREMENTS** *A. t. tachiro* group ♂ wing 172–225 mm, ♀ 211–275 mm; ♂♀ tail 152–227 mm, tarsus 52–69 mm. *A. t. toussenelii* group ♂ wing 184–203 mm, ♀ 210–243 mm. *A. t. macroscelides* group ♂ wing 184–200 mm, ♀ 204–218 mm. **Weights** ♂ 160–235 g, ♀ 230–510 (*tachiro*, *sparsifasciatus*); ♂ 150–235 g, ♀ 270–365 g (*toussenelii*).

**REFERENCES** Benson & Benson (1975), Biggs *et al.* (1979), Black & Ross (1970), Britton (1980), Browet (1969, 1979), Brosset & Erard (1986), Brown *et al.* (1982), Dewhurst (1986), Gann *et al.* (1989), Gate (1990), Games (1987), Jensen & Kirkels (1980), Kemp & Kemp (1988), Lewis & Pomeroy (1989), Lippens & Wille (1976), Louette (1992), Mackworth-Praed & Grant (1957–73), Maclean (1993), Motel & Motel (1990), Nikolaus (1987), Pakenham (1979), Pickford *et al.* (1989), Pinto (1983), Pipet (1989), Prigogine (1985), Rautenbach *et al.* (1990), Serle *et al.* (1977), Snow (1978), Steyn (1982), Tarboton & Allan (1984), Tarboton *et al.* (1989), Thiollay (1985d), van Jaarsveld (1988), van Someren (1956), Vernon (1986), Wattel (1973), Wood (1987).

## 112 CHESTNUT-FLANKED SPARROWHAWK

*Accipiter castanilius* Bonaparte, 1853

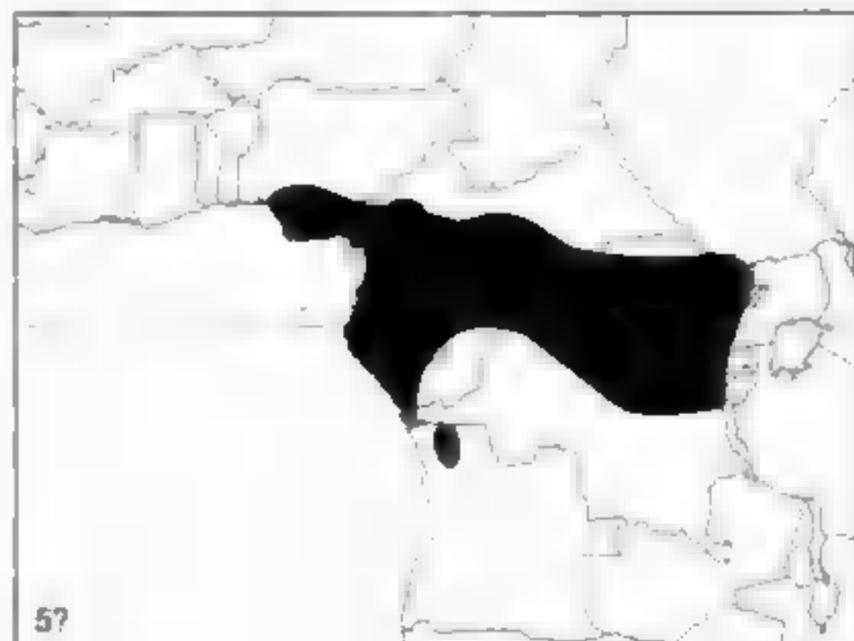
Plate 36

Other name: Chestnut-bellied Sparrowhawk

**DISTRIBUTION** Afrotropical (8°N to 6°S); order 52; little known, but considered not uncommon. Endemic to West and Central Africa: Ivory Coast and Liberia north, perhaps, to southernmost Sierra Leone and Guinea; and from south Nigeria and southern Cameroon south through Gabon and PR Congo, eastwards through much of DR Congo almost to Rwanda. Isolated population in Cabinda.

**MOVEMENTS** Probably mainly sedentary, but juveniles may be dispersive; Uganda's one record, in April 1963, was perhaps wanderer, yet not so very far from supposed limits of breeding range in DR Congo.

**HABITAT** Mainly lowland tropical rainforest, keeping



to middle storey at up to 8 m, but adapts to dense secondary growth and appears near forest villages. Sea-level to perhaps 750 m.

**FIELD CHARACTERS** Smallish to medium-sized accipiter (RSD quite marked, and eastern birds larger), as adult blackish above, and rufous, white and barred below, with heavy bill, long legs and short toes (apart from unusually long, slender middle toe); very short rounded wing-tips barely exceed upper coverts of long rounded tail. Sexes not dissimilar in plumage, but female clearly larger, averaging nearly 12% more in size, though apparently only 24% more in weight; juvenile distinct; likely to moult direct into adult plumage.

**PERCHED Adult male** Deep blue-black above, with greyer cheeks and mantle, and three clear white spots or longer patches down middle of obscurely banded tail; white below, finely barred grey on throat, coarsely barred rufous-chestnut on central breast and belly, and almost wholly rufous-chestnut on flanks and thighs (but crissum plain white); eyes reddish. **Adult female** Not dissimilar, but larger, and browner-black above, darker rufous-chestnut and more extensively barred below. **Juvenile** Dark brown to blackish-brown above, faintly edged rufous and grey, with whitish-streaked nape and only 'ghost-like' suggestion of spots down more clearly banded tail; white to cream below with brown median throat-stripe and otherwise very variable markings (heavy to almost none), including brown to chestnut-brown drop-like streaks on breast and abdomen, broad bars on flanks, narrower barring on rusty thighs. **Bare parts** Adult eyes red to reddish-brown, juvenile grey-brown to greenish-yellow. Adult cere and legs yellow, juvenile more greenish-yellow.

**FLIGHT** Smallish raptor with accipiter proportions (p. 516), but very short rounded wing-tips and long tail typical of deep-forest species; wingspan only 1.5 times total length. Skulking and secretive; said usually to fly low beneath canopy, presumably with rapid beats and short glides like other accipiters. **Adult** Uniformly dark above unless tail-spots seen, but rufous to chestnut-brown underbody contrasts markedly with white crissum and whitish underwings narrowly barred on flight-feathers (male's secondaries almost plain). **Juvenile** Largely brown above; white to cream below, body very variably spotted, streaked and barred, but wing-linings almost plain; flight-feathers thinly barred like adult female's.

**CONFUSION SPECIES** Range overlaps with three races of the very variable African Goshawk [111] (namely *canescens*, *toussenelii* and *macroscelides*), males of which are roughly same size as female Chestnut-flanked, even if relatively longer-winged and shorter-tailed. Adult female Chestnut-flanked can be very similar in plumage to male *macroscelides* in particular, and juvenile female almost impossible to separate in the field from juvenile

male *canescens* and *toussenelii*, except possibly by more rusty thighs. Adult African Goshawks are, however, generally less black above, with greyer head and orange-yellow (not red) eyes, and paler rufous below, while in flight from below adults and juveniles both have more boldly banded flight-feathers and tail, and heavily marked (not plain whitish) wing-linings. (In hand, Chestnut-flanked's long middle toe diagnostic.) Only other likely confusion species is Red-thighed Sparrowhawk [194] (broadly similar colours, but smaller, blacker above and plainer below, with short squared tail, white band across uppertail-coverts, little contrast between body and underwings in flight).

**VOICE** Not described.

**FOOD** Probably mainly birds (perhaps especially weavers of c40 g), as indicated by high RSD and long thin legs and middle toe; also young poultry, mice and other small mammals, lizards, large insects, possibly frogs and small snakes. Two attempts to catch fruit-bat recorded. Keeps to dense cover, rarely seen in open, so presumed to still-hunt and otherwise rely on surprise-flight. Recorded entering forest house after chickens; also waiting on columns of driver ants and their attendant forest birds, presumably to catch the latter or snatch any small animals fleeing from the ants.

**SOCIOSEXUAL BEHAVIOUR** No information. Presumably solitary or in pairs. No aerial displays described.

**BREEDING** Probably lays January–April in Gabon. Nest not described.

**POPULATION** No real data on numbers, although in early 1970s considered commoner than Great Sparrowhawk [151] in Gabon. Clearly seriously threatened in Guinea forests by felling and human encroachment, and elsewhere by long-term deforestation.

**GEOGRAPHICAL VARIATION** Marked increase in size towards east of range. Although this is clinal, the rise is apparently so sudden that two races are recognised here.

*A. c. castanilius* (West Africa east to Gabon and lower Congo basin)

*A. c. beniensis* (upper Congo basin) Averages c8% larger, sex for sex.

**MEASUREMENTS** *A. c. castanilius* ♂ wing 147–158 mm, ♀ 174–184 mm; ♂ tail 128–137 mm, ♀ 152–165 mm; ♂ tarsus 50–54 mm, ♀ 56–59 mm. *A. c. beniensis* ♂ wing 160–168 mm, ♀ 185–193 mm; ♂ tail 139–146 mm, ♀ 163–170 mm. **Weights** *A. c. castanilius* ♂ 135–150 g (two), ♀ 152–200 g (seven).

**REFERENCES** Amadon (1953), Ash (1990), Bannerman (1953), Britton (1980), Brosset (1973), Brosset & Erard (1968), Brown *et al.* (1982), Brunel & Thiollay (1969), Chapin (1953, 1954), Kemp & Kemp (1998), Lippens & Wille (1976), Louette (1992), Mackworth-Praed & Grant (1970), Pinto (1983), Serle *et al.* (1977), Snow (1978), Watel (1973).

## 113 SHIKRA

*Accipiter badius* (Gmelin, 1788)

Plate 35

Other names: Little Banded Goshawk (sub-Saharan Africa), Indian Sparrowhawk (Asia)

**DISTRIBUTION** Afrotropical and Indomalayan, in summer extending marginally into Palearctic (in Africa



mainly 17°N to 31°S, in Asia from 47°N in summer but otherwise c34°N to 6°N); order 7: generally common to very common almost throughout range (though less so in scarce, even rare locally, in Palearctic), and evidently stable. Sub-Saharan Africa, and southwest to south and southeast Asia: from Senegambia eastward in broad band through central Mali, south Niger, central Chad and north-central Sudan to north and east Ethiopia, Eritrea, southwest Arabia and northwest Somalia, extending south to north Liberia, south Nigeria and across northern DR Congo to Kenya and south Somalia, thence south through eastern DR Congo and much of East Africa and, in west, from southern Congo to Namibia (except most of west and south), northern and eastern South Africa; in Asia, breeds from Azerbaijan (extremely rare, few records) across north Iran eastward through south Turkmenia and then north to southern Kazakhstan and across to southern shores of Lake Balkhash, and south through west Tadjikistan and northern Afghanistan to northwest Pakistan and south, south of Himalayas, throughout Indian subcontinent to Sri Lanka (absent much of west Pakistan and parts of northwest India), in east continuing on through Burma to south China (Yunnan, Guansi, southwest Guangdong, Hainan) and south to Thailand and southern Indochina.

**MOVEMENTS** While some Palearctic adults remain around southern Caspian in winter, majority of that population migratory, leaving breeding grounds in September, a few not until October, and returning mid April to early May; most move southeast or south (cf. Levant Sparrowhawk [114]) to southeast Iran, Indian subcontinent and southeast Asia, overlapping in last two regions with resident populations, although some appear to migrate to Arabia and possibly even Africa, recorded as vagrant at Eilat, south Israel. Elsewhere in Asia apparently mostly sedentary, or with small local

movements, e.g. only summer visitor to Baluchistan and plains of northwest Pakistan; but small numbers of southeast Asian race *paliopus* (see Geographical Variation) regularly recorded in non-breeding season down to north peninsular Malaysia, few farther south, and possibly scarce winter visitor to Sumatra, where several records October–February and, more surprisingly, an old June one. In Afrotropics, some seasonal shifts associated with rains; in West Africa, some move south during October–March dry season and apparently breed in guinean woodland, returning north at onset of rains, but many seemingly remain all year in Senegambia (though far commoner during rains), also apparent northward departure from arid parts of southern Kenya in January–March; movements in Afrotropics generally, however, still to be clarified.

**HABITAT** Variety of open dry areas with trees: thus, typically ranges from dry open woodland, clearings and edges, wooded slopes, riverine forest, orchards, and cultivation with patches of trees, to thornbush, lightly wooded savannah, forest-steppe and desert fringes; frequently in and around human settlements, where common in village gardens and city parks. Much prefers broadleaved woodland, occurring also in mixed forest, as well as plantations (including of exotics, e.g. eucalyptus), but rarely encountered in pure coniferous, and otherwise generally absent only from dense or very wet woodland and driest desert areas. Sea-level to 2,000 m, mostly below 1,500 m, but in Nepal recorded occasionally to 2,250 m, and in Africa to 3,000 m (Eritrea).

**FIELD CHARACTERS** Small, relatively thickset, pale-looking accipiter, as adult grey or brown-grey above with or, more usually, without light rufous hind-collar and barred below, with small bill but rather striking pale cere, proportionately short wings and long tail, rather short legs and toes. Perches, sometimes for long periods,

upright or more obliquely in dense cover on branch, often low down and well concealed, though frequently dashing into open, but often more obviously, and not shy; wing-tips reach less than half down tail. Sexes generally distinguishable, female c10% larger and up to c10% heavier than male; juvenile distinct, but much as adult by end of first year, when can breed.

**PERCHED Adult male** Apart from variably distinct buff to light rufous nuchal collar (only in Palearctic and Sri Lanka; see Geographical Variation), all pale grey above, including head-sides (hint of darker brow-lines and thin white supraloral lines) and central tail, contrasted by dark grey to blackish-grey primaries; whitish to creamy below, throat with variable dark median streak (strongest in Asiatic *cenchroides*, faint or absent in other races) and crissum whiter and unmarked, but otherwise thinly and densely barred with light rufous (darkest and heaviest in southeast Asia) to more grey-brown (southern Africa).

**Adult female** Similar to male in pattern, sometimes almost so in coloration, too, but normally browner-washed above, especially crown and mantle, only rarely with collar, and bars below browner, less rufous. **Juvenile** Brown above with narrow rufous fringes, streaky paler head with pale nuchal spots and thin whitish supercilia, and tail more clearly barred (bars barely visible on perched adult); underparts whitish to light buff, with usually more distinct median throat-stripe, and rusty to dark brown blotches and spots on breast giving way to streaks on lower breast and belly and bars on flanks (varies geographically, in Africa more barred; see Geographical Variation). **First-year** Often much as adult, perhaps with few worn brown feathers above and odd spots/streaks on chest, but juvenile tail and flight-feathers (worn/faded) sometimes not fully moulted until second year.

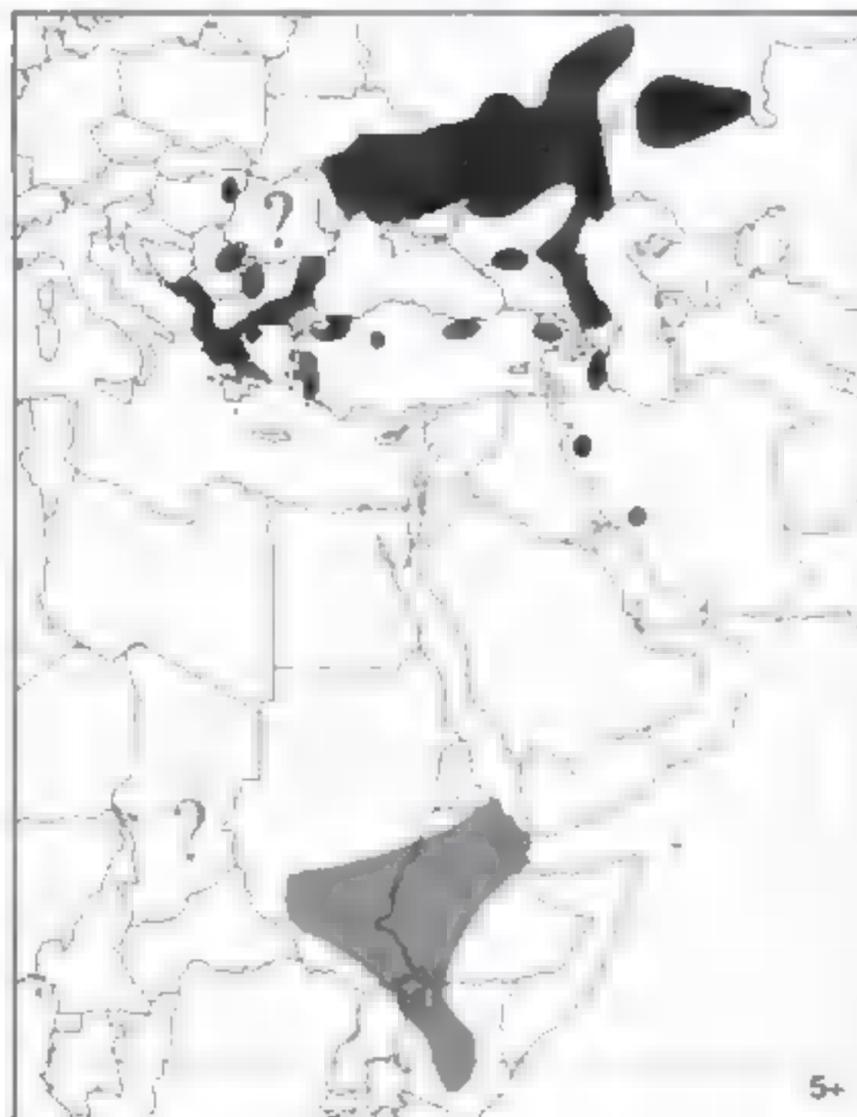
**Bare parts** Apparent regional differences in eye colour, adult males ranging from red or, farther south, even deep ruby-red (looking almost black) in Afrotropics, to orange-red in Palearctic and females correspondingly from orange-red through shades of orange to yellow; juvenile dark greyish, turning brown, then yellow. Adult cere yellow, juvenile duller and greenish. Legs yellow.

**FLIGHT** Small raptor of accipiter proportions (p. 516), if somewhat more compact than most, with medium-length to longish wings, slightly bulging secondaries, hands narrower and rounded; tail medium-length with rounded corners and, in northern tropics of Africa (*sphenurax*; see Geographical Variation), slightly protruding central rectrices; wingspan 1.9 times total length. Typical accipiter flight with fast beats and brief flat-winged glides, though less dashing than many congeners; spends much time circling in air, soars on flat wings with curved trailing edges, tail usually closed. **Adult male** All pale grey above, including head-sides, apart from variable buff to rufous collar (Palearctic *cenchroides*, Sri Lankan nominate race), narrowly black wing-tips and, when tail spread, c four to six blackish bars and broader subterminal on outer rectrices (except outermost), with thin white tail-tip; very pale below, where fine close barring on underbody and spots/bars on wing-linings produce at most an effect of slightly darker orange to grey wash (actual barring, and any median throat-stripe, visible only at closest ranges), while flight-feathers, even if thinly and densely greyish-banded (occasionally almost plain like Levant Sparrowhawk [114]), appear virtually

unmarked but for stronger bars across primaries inside very narrowly blackish tips; undertail pattern more striking in field, with about three to six dark bars obvious on central tail, where subterminal broadest; more numerous bars on whitish outer feathers considerably thinner and fainter and generally not visible. **Adult female** Very similar to male, if somewhat browner-grey and more or less collarless above, with more distinct subterminal tail-band, and more coarsely barred below (bars broader, browner); underwing-barring usually somewhat more visible, but even less dark grey or blackish on wing-tips, and undertail with up to about eight thin dark lateral bars more pronounced. **Juvenile** Pale to darker brown above with rufous fringes (variable, rarely obvious, lost when worn), head more streaky with small pale nuchal spot(s) and thin supercilia; flight-feathers with obscure thin blackish bars, whitish-tipped tail fully barred with broad subterminal (one to two bars more than adults); below, while still rather pale like adults, including white (sometimes lightly spotted) crissum, median throat-stripe more marked and entire underside more strongly patterned, as body and wing-linings heavily spotted/streaked/banded (see Geographical Variation) with rusty-brown, quills all barred deep rufous (only very tips of fingers all dark), and tail multi-banded. **First-year** See perched description above.

**CONFUSION SPECIES** Although reasonably distinctive and by far the noisiest accipiter (see Voice), needs to be distinguished from several similar congeners in different parts of its range. Most likely confusion with Levant Sparrowhawk [114], whose range when breeding overlaps in southern Caspian region and at other times in south Arabia and at least parts of sub-Saharan Africa (where Levant's winter range inadequately known, so could be widespread confusion species there); Levant noticeably darker than similar-sized Asiatic *cenchroides* and never has latter's pale hind-collar, and marginally darker and bigger than Afrotropical races; also longer more pointed wings have more contrastingly blacker ends extending to tips of inner primaries, while relatively longer tail has more bars below and square or neatly rounded end. Otherwise, in Africa, main problems arise with pale-morph Oyambo Sparrowhawk [143] (bigger, slimmer, smaller head, longer wings, orange cere and legs, fully barred tail, fully barred grey and white below, white tips on rump in close view); Little Sparrowhawk [135] (smaller, broader wings, yellow eyes, white rump, white tail-spots); and, possibly, smaller male of African Goshawk [111] (bigger, darker, usually three white patches on tail, prefers generally denser and less open habitats); while juvenile could conceivably be mistaken for juvenile Gabar Goshawk [107] (pale wing-bars, white rump, more evenly streaked breast, rarely soars). Paler Asiatic races possibly confusable variously with several other accipiters, all of which, however, darker above sex for sex: overlapping in southeast Asia are (very marginally when breeding, more widely at other times) Chinese Sparrowhawk [115] (less contrasting dark wing-tips above, plain uppertail, even less patterned below, bolder and more extensive black wing-ends made even more contrasting by unmarked white flight-feathers, no median throat-streak) and, during northern winter, migratory Japanese Sparrowhawk [136] (more pointed wings, uppertail fully barred, underwings

side of Black Sea to be expected, but recoveries of migrants ringed in Israel do include north Caucasus as well as Romania and Ukraine. In autumn, many pass through Bosphorus (maximum count 5,700 in six weeks, one-day peak of over 2,200) and, apparently, far smaller numbers via western Caucasus (290 in four weeks at two sites in northeast Turkey) before funnelling through Levant from Turkish Gulf of Iskenderun southwards through western Syria and Lebanon. Heaviest recorded passage through Israel at both seasons, but generally rather farther inland from the Mediterranean in spring, then including Jordan and interior Syria, too. (Those that breed in western Iran perhaps travel via Iraq or Saudi Arabia, where species assumed to be no more than vagrant.) September–October passage through Israel, mainly concentrated in second half September, sometimes involves dense flocks of 1,000–2,000: at Kafr Qasim, highest autumn total in 1983–87 was over 44,600 (one-day peak nearly 7,200); parallel counts in northern valleys in 1988–91 produced totals of 40,500–53,700 (one-day peaks 4,700–11,100). These concentrated autumn movements thus chiefly through northern and western Israel, but, when winds westerly, as many as 1,500 counted at Eilat in southeast corner. Slightly farther north in southeast Israel, in the Arava Valley, radar tracking of wing-beat patterns has shown that this species also migrates frequently at night, flapping instead of soaring and gliding, mainly towards the end of the concentrated migration period. On return passage northward (mid March–late May but again largely concentrated into second half April, when winds typically northerly), this is fifth commonest migrant raptor at Eilat (outnumbering Northern Sparrowhawk [145] by c100:1); highest spring total of nearly 50,000, including one-day peak of over 27,700 (but numbers much smaller if winds southerly or easterly). Migration then continues



up through central and eastern Israel (and, as already noted, other Middle Eastern countries): spring counts elsewhere in Israel have included over 7,100 in three weeks and 22,000 in 11 days, and several one-day peaks of 1,000–6,000. Despite these big numbers passing to and fro, winter quarters remain a mystery, with few records south or west of Sinai, Egypt. To northwest, vagrants have reached Czech Republic, Slovakia, Austria, Cyprus and, more interestingly, Italy and Tunisia, latter including record of one to four crossing Sicilian Channel north in spring. Any such small western (presumably trans-Saharan) route could link with single winter record in south Niger, but, apart from one in Bahrain in January, the only other October–March records anywhere have involved single birds in south Sudan, northeast DR Congo and northwest Tanzania, and four singletons in south Kenya. Taking account of one September observation of many unidentified accipiters, mostly in flocks (one of 600), passing down Nile valley in north Sudan, and apparently regular occurrence of migrant Levants in North Yemen, main winter quarters probably in northeastern Afrotropical countries between Sahara and equator (possibly also including southwest Arabia). Perhaps, once migrating flocks split up, single birds are overlooked as Shikras [113] (see Confusion Species).

**HABITAT** In summer, often in lowland river basins, valleys and floodplains, where broken forest, open woodland or more isolated groves – virtually always broad-leaved, not coniferous – are adjacent to cultivation or other open country; also riverine strips in forest-steppe and semi-desert, warm stony foothills with thickets or scrub, olive plantations, orchards, vineyards, village gardens, even urban parks. On migration, roosts in isolated groves, field vegetation and desert oases. Almost nothing known of winter habitat, but seems more likely to be thornbush and Sahel scrub than tropical forest. Breeds sea-level to 2,000 m, but mostly below 500 m and only very locally above 1,000 m.

**FIELD CHARACTERS** Medium-sized but slim-looking accipiter, grey above and rufous-banded below as adult, with small bill but prominent pale cere, relatively long pointed wings (p8 unusually long for this genus, p6 much shorter and not protruding), longish squared tail, relatively short legs and toes. Generally secretive, perching within cover, but often conspicuous on migration; wing-tips about one-third to half down tail and well beyond coverts. Sexes differ, but RSD much less than other European accipiters, with female only c8% larger (0–17%) even if possibly c40% heavier; juvenile distinct; as adult after first moult complete (many contour-feathers moulted in first winter, wings and tail in first summer, but some feathers retained until second summer). **PERCHED Adult male** All dull blue-grey above, including central tail and sides of head (virtually no suggestion of white supercilia above dark eyes), except for contrasting blackish primaries; whitish below, thinly but closely barred with pale cinnamon-rufous (almost coalescing into wash on chest) apart from plain throat with often obscure dark median streak, and white crissum. **Adult female** Similar in pattern (again, at most only short faint line immediately above eyes), but dark greyish-brown above, including cheeks, and primaries only slightly darker, often partial barring on central tail; and, below,

pale rufous-brown bars, more or less edged blackish, and slightly stronger median throat-stripe. **Juvenile** Dark brown above with rufous fringes, but paler streaky head, white showing through on hindneck; whitish to creamy-buff below with clear brown median throat-stripe, bold brown drop-like streaks in lines on breast giving way to arrowheads on lower abdomen, latter sometimes turning to broken bars on, at most, belly, lower flanks and crissum. **First-summer** Many juvenile contour-feathers variably moulted by April/May of first summer, when may be largely in adult plumage, apart from worn juvenile flight-feathers and tail (not moulted until later in summer), or may still retain drop-like streaks on chest and few or many old brown feathers on upperparts (see Confusion Species). **Bare parts** Adult eyes dark red-brown (thin outer ring of orange virtually invisible in field); juvenile dark yellow-grey (not yellow in field), becoming brown. Adult male cere pale grey-green, female yellow-green, juvenile yellow or greenish-yellow. Legs yellow.

**FLIGHT** Small raptor of accipiter proportions (p. 516), but wings relatively long with straighter trailing edges and, in particular, narrower and more pointed hands than sympatric congeners (point consists of two primaries, not three, and only four fingers showing when spread), longish tail squared or cleanly rounded at tip (no notch); wingspan 2.0 times total length. Fast beats and short glides on flat wings typical of accipiters, but looks more leisurely than confusion species because flaps shallower and more flexible; soars on flat wings with slightly curved, but not bulging, trailing edges, tail usually held closed. **Adult male** All blue-grey above, with dark eyes and grey cheeks, apart from obvious blackish wing-tips and many (six to eight) thin blackish bars on outer tail-feathers (visible only when spread, subterminal broadest in front of thin white tip); looks very pale below, apart from boldly contrasting blackish wing-tips and outer trailing edges, and dusky tail-bars thinner and more numerous on outermost; fine rufous barring gives pinkish tinge to whitish underbody and wing-linings that, at any distance, look only slightly more coloured than mainly white throat (median streak virtually invisible), white crissum, and largely white or whitish flight-feathers (actually white with faint grey barring on outermost primaries only). **Adult female** Looks all grey-brown above, with dark eyes and greyish cheeks (virtually no supercilia), and only marginally darker wing-tips, but broader lateral tail-bars than male (especially the subterminal) tend to extend to central feathers; not nearly so pale below as male, but dusky wing-tips, even though less extensive, still clear enough to be useful character; except for whitish throat (median stripe fairly well defined), whole underbody and wing-linings barred rusty-brown (strongest on breast, though often not obviously so, and palest on crissum) and thus looking darker than greyish flight-feathers with few thin dusky-grey lines; undertail pattern as male, but bars broader, subterminal stronger. **Juvenile** More or less dark brown above (and eyes look darkish), but rufous edges, variable streaks on head and often conspicuous whitish patch on hindneck give uneven look, while rump and (more fully barred) tail appear somewhat lighter; generally pale below, with dark median throat-stripe, bold brown drops and arrowheads on whitish breast and belly (any bars

broken and towards rear abdomen only), close barring on more buff wing-linings, thin barring on flight-feathers, and multi-banded tail. (Juveniles do not have contrasting dark wing-tips of adults, but males tend to have plainer greyer fingers and thinner greyer bars on rest of flight-feathers, while females have browner barring extending to whiter fingers.) See previous paragraph for variable state of moult by first summer, but always worn juvenile flight-feathers and tail until July/August.

**CONFUSION SPECIES** In breeding range, and on passage in east Mediterranean region, needs to be distinguished from Northern Sparrowhawk [145] (shorter wings more rounded – with three-point tip and five fingers – and more curved on trailing edges, longer and often notched tail with fewer broader bands, paler eyes, contrasting cheeks and often whitish supercilia, stiffer and deeper beats, flight more dashing, less soaring and gliding on migration). Adult Northern also lack contrasting dark wing-tips and juveniles have barred underbody, but beware that returning first-summer Levants may have moulted most or all contour-feathers but will still retain juvenile quills, so can have barred underbody, well-banded flight-feathers and tail, and no dark wing-tips (wing shape, flight action, and colours of sides of head and eyes then particularly important). In south Caspian region, and in Levant's likely winter quarters (sub-Saharan Africa and perhaps south Arabia), Shikra [113] is more similar in plumage (darker sub-Saharan and south Arabian race *sphenurus* smaller, while paler and slightly collared western Asiatic *cecnoides* overlaps in size, but both have shorter blunt-tipped wings and less blackish on primaries not extending to tips of inners); vagrant Shikra recorded once in Israel. (See also fig. 40 on p. 597.) With its relatively long and rather falcon-like pointed wings, whitish below with dark tips, and sometimes creamy-rufous underbody, adult male Levant might also be confused from below with adult male Lesser Kestrel [275] (broad subterminal band on otherwise plain tail, smaller dark wing-tips, stronger contrast between body and wing-linings). See also other smaller African accipiters and, in south Arabia too, Gabar Goshawk [107].

**VOICE** Main call, very different from Northern Sparrowhawk [145], described as shrill *keewick*, or high-pitched *keewick* not unlike Tawny Owl *Strix aluco*: 'from perch or on wing, in threat, mobbing, alarm, etc'. Pre-roosting migrant also repeated clear, sharp, staccato *keewick* or *keewick* two to three times.

**FOOD** Mainly lizards and large insects (orthopterans, beetles, cicadas); occasionally voles, mice, locally bats and one record of small snake; but, as might be expected from relatively low RSD and short tarsi, rather few birds (ranging from small passerines to doves *Streptopelia* and bee-eaters *Merops*). Foraging methods also differ from those of bird-eating accipiters: quarters area at height of 3–10 m, using slow glides, occasional flaps, intermittent hovering, then swoops to open ground or deftly into vegetation, rising immediately again with or without prey. But, at one Hungarian nest where only recorded prey was birds, these were stalked by flitting from tree to tree, method sometimes used elsewhere for catching cicadas. Most prey taken on ground or in trees, but bats

hawked at dusk. Said to hunt in pairs, even outside breeding season and flocks on migration will feed together on swarming insects.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs, except on migration, when highly gregarious: then commonly in flocks of 20–100, even up to 1,000–2,000 (in Israel, largest total one-day count of migrants passing over single site was 22,747 at Eilat on 25 April 1987; see *Movements*); migrants roost communally in trees, often using same isolated clumps in open country in different years, or by day in desert even rest on ground. No information on aerial displays other than high-circling, which probably frequent.

**BREEDING** Mid May–August. Slight structure of twigs, up to 30 cm across and 15 cm deep, lined with green leaves, at 5–10 m (4–20 m) in fork or on branch of broad-leaved tree in isolated clump, open woodland or forest edge, often near running water. Clutch 3–5. Incubation c.30–35 days. Fledging c.40–45 days; independence 15+ days later.

**POPULATION** Limits of known breeding range enclose no more than 1.2 million km<sup>2</sup>, and distribution believed to be very patchy within much of that area, but nests have been recorded as little as c.100 m apart and species is clearly far more numerous than was thought as recently as early 1980s. Even so, still considered rare or irregular in Hungary, very scarce in former Yugoslavia, Albania, Bulgaria, Romania and Turkey, and rare or extinct in Caucasian countries and western Iran. In north Balkans and Caucasus as whole, said to have declined significantly in 20th century: examples are Bulgaria (once commoner than Northern Sparrowhawk [145], but only c.150 pairs by 1993), Serbia and Montenegro (down from 'numerous' to 'scarce' or 'rare'), and Georgia (no breeding records since 1920s). Indeed, with exception of estimates of 1,000 pairs in Greece, 3,000 pairs in south European Russia and (largely within Russia) 1,000–1,500 pairs in Don basin, all national and regional figures are very small. But it is clear that this species must be overlooked or underestimated, or the range extensions up the Volga and Ural basins, and across into Kazakhstan (not confirmed until 1951), are

greater than realised: all the current breeding-population estimates total fewer than 6,000 pairs, while over four times that number of individuals have been recorded passing north through Eilat on one peak day and nearly 50,000 in a spring season (see *Movements*). Interestingly, recent studies on the middle Volga revealed an average density there of 17.3 pairs/100 km<sup>2</sup>: though the result of applying that average evenly over the whole range would be unrealistic in view of the patchiness of the summer distribution farther west and south, a calculated guess that takes account of the Eilat numbers leads us to expect a breeding population of something over 30,000 pairs. Certainly, with the addition of juveniles, the total wintering mysteriously in an uncertain part of Africa must be high in the tens of thousands and may even reach six figures.

**GEOGRAPHICAL VARIATION** Monotypic. Sometimes treated as race of Shikra [113], but differs in wing-formula, proportions and barring, and breeding ranges contiguous or overlapping south of Caspian Sea. Both are parts of a complex species group (rather than a superspecies) that also includes Chinese and Nicobar Sparrowhawks [115, 116].

**MEASUREMENTS** ♂ wing 210–228 mm, ♀ 226–245 mm; ♂ tail 146–162 mm, ♀ 155–176 mm; ♂♀ tarsus 46–54 mm. **Weights** ♂ 135–225 g (seven), ♀ 232–275 g (two).

**REFERENCES** Abuladze (1994a), Acadi (1964), Backhurst *et al.* (1973), Beaman & Madge (1998), Belk (1992), Benson (1970), Bodenstern (1943), Brown *et al.* (1982), Cameron *et al.* (1967), Christensen (1960), Clark & Schmitt (1999), Cramp & Simmons (1980), Dementiev & Glukov (1951), Esilevskaya & Brvukhanov (1991), Forsman (1999), Gallagher & Woodcock (1980), Galushin *et al.* (1996), Gensbøl (1986, 1995), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Hagemeyer & Blair (1997), Handrinos & Akrotis (1997), Handrinos & Demetropoulos (1983), Hollom (1959), Hollom *et al.* (1988), Hûe & Etchécopar (1970), Jennings (1981), Kemp & Kemp (1998), Lesnichiv *et al.* (1986), Mackworth-Praed & Grant (1957), Potter & Willis (1968), Potter *et al.* (1981, 1996), Shirihai (1996), Shirihai & Christie (1992), Shirihai & Yekutieli (1991), Shirihai *et al.* (1996), Stark & Liechti (1993), Stegmann (1983), Thirllay (1977b, 1989c), Wattel (1966, 1975), Zeko (1965), Zimmerman *et al.* (1996).

## 115 CHINESE SPARROWHAWK *Accipiter soloensis* (Horsfield, 1821)

Plate 40

Other names: Chinese or Grey Goshawk, Grey Frog Hawk, Horsfield's or Little Sparrowhawk

**DISTRIBUTION** Eastern Palearctic and marginally Indomalayan in northern summer (at least 43°N to c.22°N); Indomalayan and very marginally Australasian and Micronesian in northern winter (c.24°N to 9°S); order 3+; locally common. Eastern Asia, but limits of breeding range imprecisely known: at least southernmost Ussuriland into southern Manchuria (Liaoning) and North and South Korea, then, apparently disjunctly, interior southeast China (from south Shaanxi, Henan, Anhui and Zhejiang south to east Yunnan, Guangxi and Guangdong); supposedly also Taiwan; possibly northeast China, farther north in Ussuriland, or even northern

Japan (see below). Winters from tropical extreme south of breeding range (Guangdong, Hainan, southern Fujian, apparently Taiwan) southward patchily through all mainland countries of southeast Asia west to north Thailand and southeast Burma (Tenasserim) and to varying extents within almost continuous ring of islands formed by Andamans, Nicobars, Sumatra, Java, Lesser Sundas (at least Bali and Flores), Waigeo and adjacent northwest New Guinea, Moluccas (Bacan and Halma-hera northward), Sula, Sulawesi and Buton, Sangir and Talaud (north of Sulawesi), and eastern Philippines (but not Calamians or Palawan); apparently scarce in Borneo.

**MOVEMENTS** Most, if not all, of population migratory, moving south late August–October and returning

linings, and often median throat-stripe. The migratory Japanese Sparrowhawk [136] and largely sedentary Bestra [137] (both overlapping considerably with Chinese, especially in latter's winter range) have barred tails and much darker and extensively barred underwings. Juveniles of all these four species often unreliably distinguishable in field, though in really good views Chinese can be identified by relatively plain underwings with more contrasting dusky outer primaries, and darker stouter crown. Beware that Japanese Sparrowhawk likewise flocks on migration. See also Northern Sparrowhawk [145] (mostly breeding farther north in Asia, occurring as rare winter visitor south to Indochina and Thailand), which among other differences is generally larger, sex for sex, and more rounded-winged, with banded tail, more or less rufous cheeks and strongly barred underparts as adult, spotted and barred (not streaked) underparts as juvenile. In Sulawesi, note adult Spot-tailed Sparrowhawk [118], which has comparably white underwings but differently patterned wing-tips and much blacker undertail.

**VOICE** Silent except when breeding, and really noisy only in display period before nest-building. Sharp *kee-kee-kee...* in courtship; repeated shorter *kee-kee-kee...* in anxiety at nest; loud call by male approaching nest with food (similar to that of Northern Sparrowhawk [145]); low whine by female at nest with food.

**FOOD** Frogs, large insects, lizards, at least some small birds; small mammals, small fish and crayfish also recorded. Frogs may be main prey in breeding season, and one Korean population lived exclusively on frogs, but insects (e.g. grasshoppers, dragonflies, beetles) and small birds perhaps more important in winter quarters. Takes most prey on ground or in shallows; mostly still-hunts from more or less open perch, but also forages by flying or gliding low, or circling, over wetland areas and open woodland; occasionally hovers.

**SOCIOSEXUAL BEHAVIOUR** Gregarious on passage, and numbers arrive together in summer quarters; small loose parties during pair-formation; otherwise singly or in pairs. Males repeatedly chase females on arrival in breeding areas, with groups of as many as seven recorded. Aerial displays mainly concentrated into last fortnight of May, before nest-building, and include single and mutual high-circling interspersed with bursts of wing-flapping and gliding; and undulating sky-dance of rollercoaster type with dives of up to 30+ m.

**BREEDING** Concentrated season: arrives Korea early May, displays late May, nest-builds into early June, lays early to mid June, hatches early July, young leave nest August (all perhaps a little earlier in southeast China). Slight nest of twigs, 35–43 cm across and c 13 cm deep, lined with green leaves and pieces of bark, at 6–15 m in fork or on lateral branch of large or small tree, often in clump near open wetland. Clutch 3–4 (2–5). Incubation and fledging periods imprecisely known, though young said to start leaving nest at 22 days.

**POPULATION** As species apparently particularly numerous during northern winter in eastern Philippines and north Sulawesi, but rather less so in peninsular Thailand ('uncommon') through Malaysia to Greater Sundas (merely 'not uncommon'), the more northerly breeding population in and north of Korean peninsula may be the larger of the two. Migration counts have shown more than 10,000 passing through Okinawa in one autumn. Of these, say 50% likely to be adults. Thus, total numbers certainly in five-figure range and perhaps at higher end of that scale. Breeding distribution extends over at least 2 million km<sup>2</sup>, in which case a 'locally common' accipiter of patchwork open country with woods and paddyfields could well run into six figures.

**GEOGRAPHICAL VARIATION** Monotypic, despite some individual variation in depth of colour on upperparts and chest (see Field Characters). Most similar in many ways to geographically well separated Levant Sparrowhawk [114]; both sometimes treated as forming a superspecies with Shikra [115] and Nicobar Sparrowhawk [116].

**MEASUREMENTS** ♂ wing 170–201 mm, ♀ 186–209 mm; ♂ tail 120–132 mm, ♀ 127–139 mm; ♂♀ tarsus 39–44 mm. **Weights** ♂ 140 g (one), ♀ 204 g (one).

**REFERENCES** Ali & Ripley (1978), Ash (1993), Beehler *et al.* (1986), Brazil (1991), Brazil & Hanawa (1991), Cheng Tschin (1987), Coates (1985), Coomans de Ruiter (1954), Deignan (1945), Dementiev & Gladkov (1951), Dickinson *et al.* (1991), Etchécopar & Hôe (1978), Fennell (1965), Gore & Won (1971), Hachisuka & Udagawa (1951), Hou *et al.* (1990), King *et al.* (1975), Knyshtant (1993), Lekagul & Round (1991), Mackinnon & Phillipps (1993), Medway & Wells (1976), Meyer de Schauensee (1984), Pratt *et al.* (1987), Severinghaus & Blackshaw (1976), Smythies (1981), van Marle & Voous (1946), Wattel (1975), Wells (1999), White & Bruce (1986), Wolfe (1950).

## 116 NICOBAR SPARROWHAWK

*Accipiter butleri* (Gurney, 1898)

Plate 41

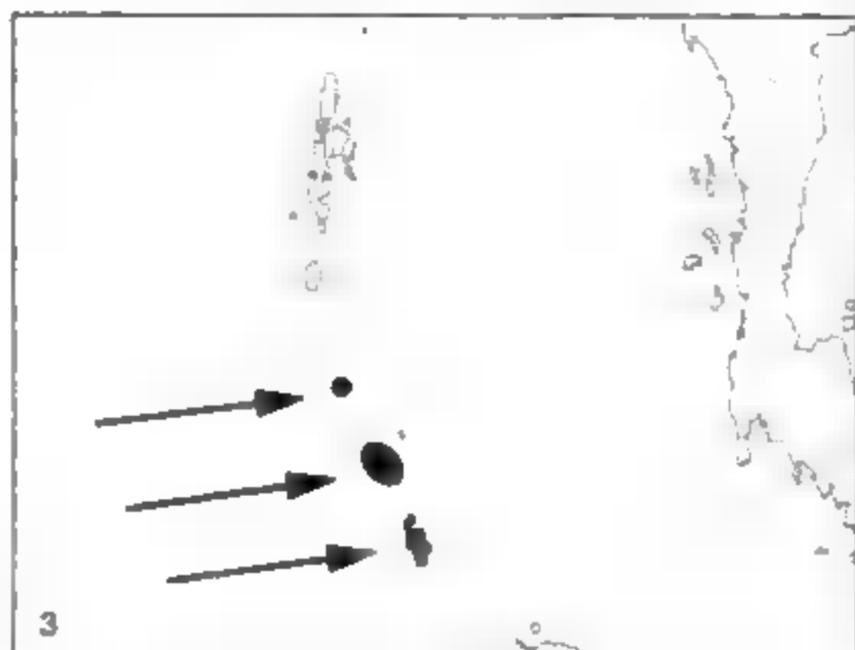
Other names: Nicobar, Car Nicobar or Katchall Shikra

**DISTRIBUTION** Indomalayan (9°N to 7°N); order 3; considered fairly common in southernmost islands of restricted range, scarcer or possibly extinct farther north. Endemic to Nicobar Islands in Bay of Bengal: widespread on Great and Little Nicobar, less so on Nancowry and Katchall, no recent records from Camorta or Car Nicobar.

**MOVEMENTS** Presumably sedentary.

**HABITAT** Dense primary forest, mainly in upper storey; not found in open or scrub jungle. Mostly below 100 m.

**FIELD CHARACTERS** Small accipiter, as adult mainly plain grey and white, with relatively heavy bill, very short wings, medium-length tail and legs, short toes. Said to perch within cover and to be shy and difficult to see; wing-tips probably do not exceed tail-coverts. Sexes



rather similar, but female slightly darker and may average c5% larger; juvenile very distinct; presumably as adult after first moult completed.

**PERCHED Adult male** All pure bright pale bluish-grey above, palest on head, and unmarked except for variably whitish supercilia and lores, darker primaries, and obscure dusky subterminal tail-bar; all white below, but for traces of median stripe on sometimes greyer throat and faint pale rufous or fawn vermiculations on chest and upper flanks. **Adult female** Slightly browner above; clearer but still delicate barring on chest. **Juvenile** Rich rufous-chestnut above with darker leather-centres that make nape look almost solidly dark, and back and wing-coverts spotted; paler, more rufous-cinnamon tail has dark brown subterminal band and incomplete central one, while similarly coloured secondaries show two dark bars; all light rufous-buff below, or more whitish on belly and crissum, with chestnut streaks on breast and rufous blotches on flanks, belly and thighs. **Bare parts** Adult eyes bright orange-yellow to orange or dark red (different populations), juvenile greyish-white. Adult cere greenish-yellow, juvenile pale greenish. Adult legs yellow, juvenile paler.

**FLIGHT** Very small raptor with accipiter proportions (p. 516), but very short and somewhat pointed wing-tips, medium-length tail; wingspan 1.7 times total length. Flight action and wing positions not described, but perhaps comparable with Shikra [113]. **Adult** All pale blue-grey above (or with brownish tinge), palest on head, with whitish supercilia, but darker wing-tips and obscure subterminal band on otherwise plain tail; largely white below, including wing-linings, but for faint rufous to fawn barring on chest and upper flanks, unbarred grey flight-feathers with only slightly darker tips and whitish-mottled bases, and pale grey tail with slightly more obvious subterminal band (traces of two other bars when spread). **Juvenile** 'Young birds on the wing look as red as, or redder than kestrels [277]' (Butler); above, rich rufous-chestnut with darker nape-patch, dark-spotted back and wing-coverts, paler tail and secondaries, each with two dark bars, and darker wing-tips; below, largely pale rufous-buff on body and wing-linings, streaked and blotched darker, but quills pale rufous-cinnamon with four to five thin dark bars on flight-feathers, slightly darker-tipped primaries, and inconspicuous central and subterminal tail-bands.

**CONFUSION SPECIES** Adult and juvenile both rela-

tively easy to identify, if seen. Four other sparrowhawks which can or could occur in Nicobars are possibly breeding Besra [137] and, especially during October-March, migrant Japanese [136], Chinese [115] and the generally larger Northern [145], but races concerned have longer and more pointed wings and, in most cases, shorter tails: adults are darker above and mostly more heavily marked or coloured below (in case of Chinese Sparrowhawk, note contrasting black wing-tips), while juveniles are all much browner above and more heavily marked below. (Migrant female and juvenile Common Kestrels [277] are perhaps more likely confusion species for juvenile Nicobar Sparrowhawk.)

**VOICE** Shrill double *tee-weck*, likened to one of main calls of Shikra [113].

**FOOD** Chiefly lizards, also insects. No information on hunting methods.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No account of any displays, apart from calling from tops of trees (when human intruders near nest?).

**BREEDING** Little information. Despite suggestion (B&A) of empty nest in September and highly unlikely twice-yearly breeding, the only recorded nest, just completed at c12 m on end of horizontal branch of fig tree *Ficus*, was probably in February. Nothing known of clutch size, incubation or fledging.

**POPULATION** No density estimates available. 'Forest loss on the islands is limited', and the species is 'widespread and fairly common on Great and Little Nicobar' (BirdLife International). These two islands make up a two-thirds of the 1,645 km<sup>2</sup> area of the Nicobars, so it seems reasonable to expect an accipiter population in low hundreds (but not much more). Declines in the northernmost and, probably, the central islands of the group appear likely: when species first named from Car Nicobar at the end of the 19th century, it was considered not uncommon there, but none was found during 1980s raptor survey and, though that in itself is not conclusive with such a shy forest species, it could indicate that the nominate race (see Geographical Variation) is extinct.

**GEOGRAPHICAL VARIATION** Two races.

*A. b. butleri* (Car Nicobar) Smaller; darker nape and cheeks, greyish-cream throat, pale rufous bars on chest, orange eyes.

*A. b. obsoletus* (Central and southern Nicobars) Apparently significantly larger; paler nape and cheeks, clearer supercilia, whiter throat, very indistinct pale fawn bars on chest, dark red eyes.

Formerly regarded as conspecific with Shikra [113], but clearly long isolated and differs markedly in structure, plumage (especially juvenile) and ecology; both better considered as parts of a complex that also includes Levant and Chinese Sparrowhawks [114, 115].

**MEASUREMENTS** *A. b. butleri* ♂ wing 167–178 mm, ♀ 180–181 mm (two); ♂ tail 134–140 mm, ♀ 148–152 mm (two); ♂♀ tarsus 43–48 mm. *A. b. obsoletus* ♀ wing 192 mm, tail 157 mm, tarsus 52 mm (one). **Weights** No data.

**REFERENCES** Ali & Ripley (1973), BirdLife International (2000), Butler (1899), Richmond (1903), Tikader (1988), Wattel (1973).

recall male of nominate *francesii*, but washed and faintly vermiculated with salmon-pink on breast, and four dark bands on tail.

*A. f. pusillus* (Anjouan) Averages slightly smaller still; both sexes again more like male *francesii*, but largely white below with grey wash only at sides, obscure barring on tail; juvenile tends to spotting rather than barring below.

*A. f. brutus* (Mayotte) Equally small; both sexes more akin to female *francesii*, being warm brown above with greyer head and pale cheeks, and white below with pronounced rufous bars on breast; juvenile more broadly edged rufous above, and again tending to spotting below. (See also notes facing plate 38.)

**MEASUREMENTS** *A. f. francesii* ♂ wing 151–163 mm, ♀ 166–188 mm; ♂ tail 140–150 mm, ♀ 160–163 mm. *A. f. griveaudi* ♂ wing 135–149 mm, ♀ 167–171 mm; ♂ tail 104–116 mm, ♀ 113–129 mm. *A. f. pusillus* ♂ wing 135–149 mm, ♀ 155–163 mm; ♂ tail 99–108 mm, ♀ 113–125 mm. *A. f. brutus* ♂ wing 137–143 mm, ♀ 150–162 mm; ♂ tail 101–109 mm, ♀ 118–128 mm. **Weights** *A. f. francesii* ♂ 102–116 g (HBW).

**REFERENCES** Appert (1972), Benson (1960), Dee (1986), King (1978/79), Langrand (1990), Langrand & Meyburg (1986), Louette (1988), Malcolm (1970), Milon *et al.* (1975), Thibault & Guyot (1988), Thiollay & Meyburg (1981), Wattel (1975).

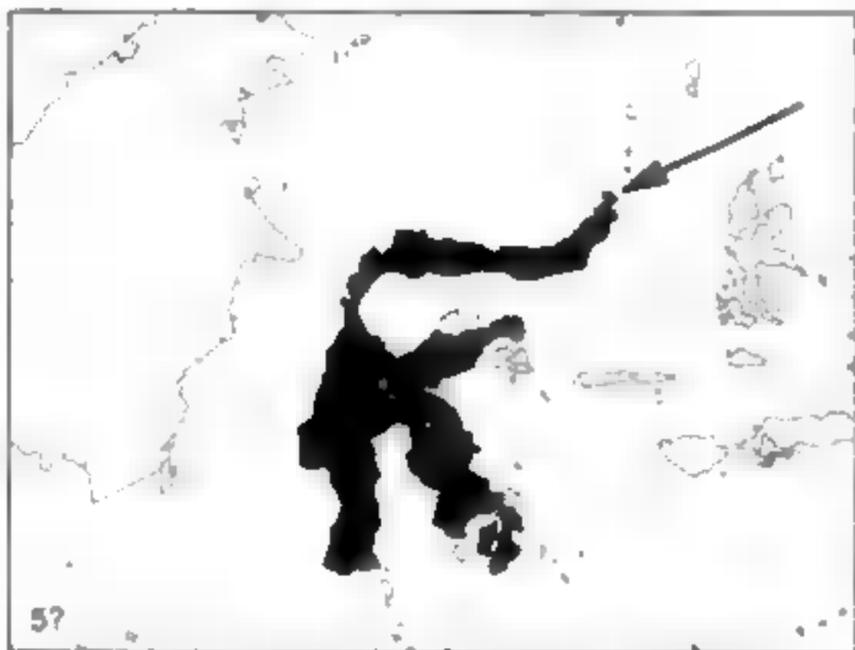
## 118 SPOT-TAILED SPARROWHAWK *Accipiter trinotatus* Bonaparte, 1850

Plate 42

Other names: Spot-tailed Accipiter/Goshawk

**DISTRIBUTION** Indomalayan, in intermediate Wallacea (2°N to 6°S); order 5?; moderately common in forested areas. Central Indonesia: endemic to Sulawesi and some satellite islands (at least Talisei, Muna and Buton).

**MOVEMENTS** Apparently sedentary.



**HABITAT** Primary forest and tall secondary growth in lowlands and foothills, also dense mangrove. Sea-level to 1,600 m, perhaps commonest at 250 m to 1,300 m.

**FIELD CHARACTERS** Small to smallish accipiter, as adult mainly blue-black and rufous-buff to cream, with relatively heavy bill, very short wings and proportionally long rounded tail, longish legs, short toes. Unobtrusive, perching entirely within cover, at any level from forest floor to canopy; wing-tips probably do not exceed tail-coverts. Sexes similar, but female averages 10% larger (up to 17%); juvenile distinct; as adult after first moult completed.

**PERCHED Adult** Looks black above, though largely dark bluish-slate with slightly less dark blue-grey nape to mantle and distinctly paler grey cheeks, often white tips to some scapulars, and blacker tail with white tip and two to three white spots on inner webs (forming broken bars when spread); below greyish-white throat, rufous-

buff breast shading to usually whiter abdomen and thighs. **Juvenile** Mainly bright rufous above, but crown heavily streaked dark brown (mantle sometimes also spotted, but usually obscurely), primaries showing black spots, and tail more or less black with variably extensive rufous wash, especially at sides, and usually (not always) larger white spots than adult; cream to variably pale rufous below, heavily streaked with blackish-brown on breast and flanks. **Bare parts** Adult eyes brown to red-brown, juvenile grey to brown. Adult cere orange, juvenile brown. Adult legs rich chrome-yellow, juvenile duller.

**FLIGHT** Rather tiny raptor with accipiter proportions (p. 516), but very short rounded wings, relatively long tail; wingspan 1.7 times total length. Flight action and wing positions not described. **Adult male** More or less black above, with greyer head, often some white on scapulars, and white tip and two to three white spots on tail (or broken bars when spread); predominantly whitish below, including lower abdomen and much of underwings, but rufous-buff breast, dusky tips to all flight-feathers, also few short bars on primaries, and blackish tail with two to three white bars. **Adult female** More barring on undersides of flight-feathers extending across outer secondaries. **Juvenile** All plain rufous above, apart from brown-streaked head, thin black bars on primaries, and two to three white spots and tip on more or less rufous-edged black tail; rather pale below, all cream to light rufous, apart from heavy blackish streaks on breast and flanks, thin black bars on rufous flight-feathers and tail-sides, dusky central tail with white tip and two to three bars.

**CONFUSION SPECIES** Perched adult looks almost identical to two other (not closely related) Sulawesi endemic forest accipiters, which all hard to see (though attracting attention by different calls): Sulawesi Small Sparrowhawk [138] (square-ended and proportionately shorter tail obscurely banded, with no white tip and spots missing from central feathers, greyer thighs, thinner orange legs with longer toes, green cere) and male Vinous-breasted Sparrowhawk [142] (square-ended and proportionately shorter tail without spots, grey thighs, thinner yellow legs with long toes, much greater RSD so females clearly bigger). In flight, from below, both look rather darker because of more or less dusky-stippled buff

wing-linings and strongly barred flight-feathers (instead of largely plain cream underwings with limited barring and dark tips), while their shorter squarer tails do not show the white tips and two to three complete white bars (Small has broken bars). Perched juveniles also very similar, but Sulawesi Small Sparrowhawk has rufous tail with blackish bands, and more boldly blotched flanks, while Vinous-breasted more easily distinguished by blacker crown, extensively blackish-spotted back and wings, and paler rufous tail with clear blackish bands. Both again are darker in flight from below, with mottled linings and more heavily barred flight-feathers and tails (especially Vinous-breasted). Consider also small juvenile male Sulawesi Crested Goshawk [110] (much browner above, greyer cheeks, banded tail, short sturdy legs) and, especially in October–March, migrant Chinese and Japanese Sparrowhawks [115, 136] (both have longer and more pointed wings and are much more likely to be seen in open: although shades of slate above and rufous to grey below, adults not so dark and have plain slate or banded grey tails, while much browner juveniles have pale supercilia, but underwing pattern of adult Chinese could be confused with that of Spot-tailed).

**VOICE** Calls quite frequently. Deliberate *hee* repeated unhurriedly four to six times. Also 'miaowing' cry.

**FOOD** Mostly small lizards and snakes, and grasshoppers (perhaps also other large insects); some frogs and snails; one stomach contained three bats, another a small bird. Believed mainly to perch-hunt inside forest at any level, but perhaps chiefly near ground as readily mist-netted, dashing at prey as soon as sighted.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Remains in dense cover: no account of any displays, aerial or otherwise.

**BREEDING** No information.

**POPULATION** Most numerous of Sulawesi's four endemic accipiters, formerly very common and probably still moderately common through lowland forest and mangrove, as well as showing some adaptability to secondary growth and human pressures. No data on densities but, at around 180,000 km<sup>2</sup>, Sulawesi is about four-fifths the size of Great Britain, which, for example, holds estimated 32,000 pairs of Northern Sparrowhawks [145]. Thus, it may not be unreasonable to guess at five-figure population of Spot-tailed Sparrowhawks for an island which still has extensive areas of forest, even though these are shrinking and the northern and southern peninsulas are now heavily populated.

**GEOGRAPHICAL VARIATION** Best treated as monotypic. Southern peninsular populations of Sulawesi, together with those of Muna and Buton, have been separated as *haesitandus*, mainly on slight differences in tones of juvenile plumage, but seem dubiously distinct. Although this species is very similar in appearance to Sulawesi Small and Vinous-breasted Sparrowhawks [138, 142], the three are not closely related in structure and their plumage similarities are considered a result of convergent evolution: indeed, Spot-tailed stands taxonomically isolated (see Wattel).

**MEASUREMENTS** ♂ wing 148–153 mm, ♀ 157–173 mm; ♂ tail 124–129 mm, ♀ 134–143 mm; ♂♀ tarsus 49–55 mm. **Weights** No data.

**REFERENCES** Bishop *et al.* (1994), Gibbons *et al.* (1993), Meyburg & van Balen (1994), Rozendaal & Dekker (1989), Stresemann (1940a), van Balen (1994), van Bemmel & Voous (1951), van Marle & Voous (1946), Wattel (1973), White & Bruce (1986).

## 119 BROWN GOSHAWK

*Accipiter fasciatus* (Vigors & Horsfield, 1827)

Plate 48

Other names: Australian or Australasian Goshawk

**DISTRIBUTION** Australasian and, mainly in intermediate Wallacea where six or seven endemic island races, very marginally Indomalayan (3°S to 44°S); order 6; widespread and often common, though island distribution curiously patchy and confused, and generally much less common in New Guinea than Australia. Australia, Indonesia, New Guinea and Melanesia: throughout Australia (except deserts), including Tasmania and coastal islands, northwest in Indonesia to main chain of Lesser Sundas (many, but apparently not all, islands from Lombok and Sumbawa to Timor, Damar and Babar), as well as other archipelagos in Flores and Banda Seas (Bonerate and Tukangbesi groups) and farther north, in southern Moluccas, Buru (?migrants only: see Movements); then northeast to eastern and central southern New Guinea and, after a gap, Rennell and Bellona in southernmost Solomons; and east to Vanuatu, Loyalty Islands and New Caledonia. Some subspecifically similar populations are separated by islands where the species is either apparently absent or represented by another race (see Geographical Variation).

**MOVEMENTS** Typically sedentary, with immatures nomadic, but evidently also partially migratory in some areas: in Tasmania and southeast Australia, though mostly resident, some leave individual territories and even whole localities in winter, April–August, while influxes occur elsewhere (some suggestion of shift to more suburban districts); northward movements also recorded in Western Australia, and some winter increases in north Australia. Longest ringing recovery only 960 km NNE from Canberra area. But success as island colonist highlighted by three discernible waves of arrival in Lesser Sundas, as well as by occurrence of nominate Australian race in Timor and, even more, by its probably relatively recent spread to Rennell and Bellona across 1,600 km of sea. Specimens from Buru (south Moluccas) likewise very similar to tropical Australian birds 1,000 km away, perhaps also indicating later arrival, or even casual migration or vagrancy. One vagrant also reached Norfolk Island, 1,400 km east of Australia.

**HABITAT** Most wooded areas, including forest edge and clearings, secondary growth, open woodland, stands of large trees, shelterbelts, riverine strips, timbered savannah.



urban parks, suburban and native village gardens, and such more open areas as farmland and mountain grassland where forest patches or scattered trees remain. Also hunts over heathland and other completely open country, but not found in desert or dense tropical forest. Sea-level to 2,000 m, but only locally in New Guinea above 1,500 m.

**FIELD CHARACTERS** Mid-sized to very large accipiter, brown-grey and rufous-banded as adult, with heavy head, prominent brow-ridges, relatively long wings, longish tail, and long thick legs but short toes. Perches secretively in cover for lengthy periods, but in Sumbawa often conspicuously and in Flores frequently over rivers; wing-tips half or less down tail. Sexes very similar, but female up to 30% larger and commonly 30–80% heavier; juvenile distinct, begins to moult into intermediate immature stage early in second year; as adult from third year. **PERCHED Adult nominate race** (see Geographical Variation) Generally slate-grey or sometimes paler grey above, with variable brownish wash (particularly, but not always, on females), apart from rufous nuchal collar (often brighter and wider on males); all finely barred rufous-brown and white below, but for grey-dappled throat. Female tends to be slightly browner above and more barred below than otherwise brighter male, but distinguishable in field only by size and behaviour. **Juvenile** Brown above with some white streaks and blotches, particularly on crown and nape, and rufous edges (these often lost by age six months, though earlier sometimes pronounced enough on head to give capped appearance); whitish below, with heavy brown streaks on throat

and chest and coarse brown barring on abdomen and thighs. **Second-year** Brown above with some white streaks on crown, no rufous edges, but often rufous nuchal collar; broadly barred dark rufous-brown and whitish below, but throat usually coarsely dappled. **Bare parts** Adult and second-year eyes yellow, juvenile pale brown, changing through cream to pale yellow. Adult and second-year cere greenish-yellow, juvenile cream. Legs yellow (sometimes orange), but juvenile paler.

**FLIGHT** Medium-sized, active, powerful raptor with accipiter proportions (p. 516), but relatively projecting head (almost recalling *Pernis*), long pointed wing-tips, straight or slightly rounded trailing edges, and long rounded tail; wingspan 1.8 times total length. (See also fig. 39 on p. 570.) Flight fast and strong with rapid bursts of quick deep flaps; glides on slightly bowed wings, but soars with small dihedral. **Adult** Grey above with rufous collar; all finely barred below: rufous on body and wing-linings, greyish and more indistinct on flight-feathers and tail. **Juvenile** Mainly brown above; underwings and tail much as adult, but whitish underbody coarsely marked with brown streaks on chest and brown bars on abdomen. **Second-year** Similar to juvenile above, or may have rufous collar, but all coarsely brown-banded below.

**CONFUSION SPECIES** No plumage features reliably separate Collared Sparrowhawk [139] in Australia and New Guinea, apart from more heavily barred undersides of flight-feathers and tail, but that has smaller head with more staring eyes (no brow-ridges), spindlier legs with much longer middle toes, more curved trailing wing-edges, shorter tail with squared or notched tip, and more

415 g, ♀ 440–750 g. *A. f. didimus* ♂ 178–268 g, ♀ 264–405 g. *A. f. polycryptus* ♂ 185–260 g.

**REFERENCES** Aumann (1986, 1988a/b/c/d, 1989a/b, 1990b/c, 1993), Baker-Gabb (1984a/b), Beehler *et al.* (1986), Blakers *et al.* (1984), Bregulla (1992), Buckingham *et al.* (1995), Burton (1993), Burton & Alford (1994), Burton *et al.* (1994), Coates (1985), Copper (1976), Copper & Copper

(1981), Currie *et al.* (1993), Czechuta *et al.* (1987), Debus (1994), Garnett (1992), Hollands (1984), Marchant & Higgins (1993), Mayr (1945a/b), Moore (1981), Morris (1976a), Newgrain *et al.* (1993a/b), Olsen & Marples (1992, 1993), Olsen & Olsen (1981), Olsen & Olsen (1985, 1987c), Olsen *et al.* (1982, 1990, 1993), Rand (1942), Schodde & Tidemann (1988), Stokes (1988), Thiollay (1993a), van Balen (1994), Wattel (1973), White & Bruce (1986).

## 120 GREY GOSHAWK

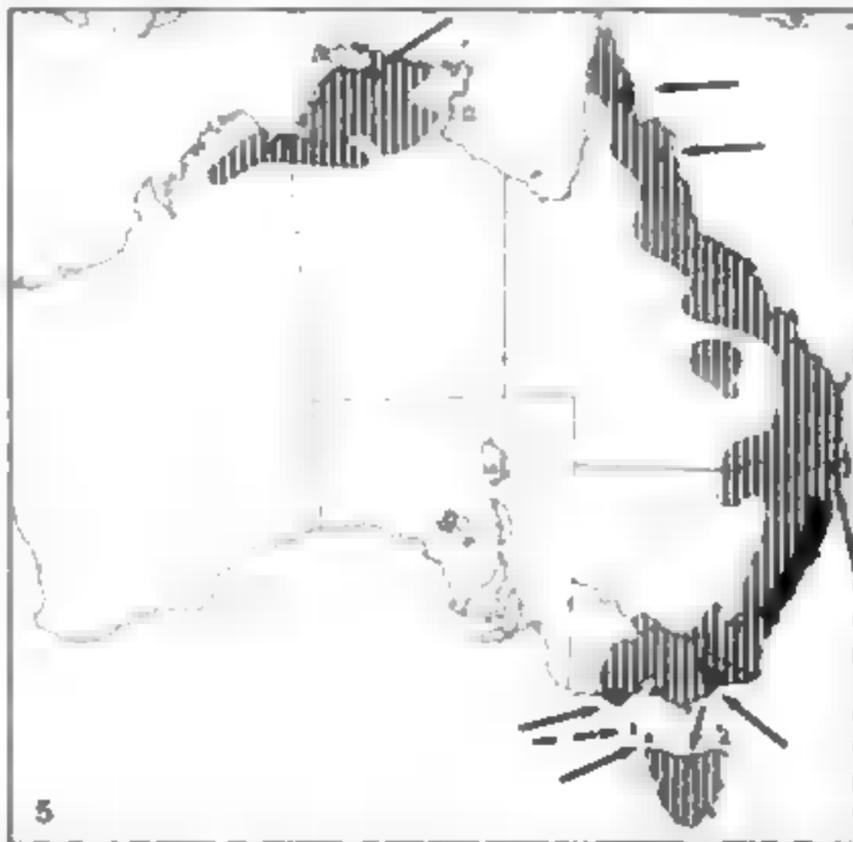
*Accipiter novaehollandiae* (Gmelin, 1788)

Plate 47

Other name: White Goshawk

**DISTRIBUTION** Australasian (11°S to 44°S); order 5; locally fairly common. Endemic to north, east and south-east Australia, including coastal islands, and west Tasmania.

**MOVEMENTS** Basically sedentary, but evidently some dispersing or nomadism by non-breeders, especially juveniles, around Gulf of Carpentaria and in east Tasmania.



**HABITAT** In east and southeast Australia breeding confined to tall wet forest with luxuriant growth, but in northern parts found in more open or riverine forest and timbered gullies, also mangrove fringe, and in southern Tasmania among more stunted forest trees. Immatures and other non-breeders may live in open woodland or other less timbered habitats and occasionally wander even into urban areas. Sea-level to 1,500 m.

**FIELD CHARACTERS** Largish to large, powerful accipiter, all white or grey and white in all plumages, with heavy bill and short thick legs and toes. Perches secretively inside canopy; short rounded wing-tips cover only base of relatively short squarish tail. Dimorphic, with grey and white morphs according to parentage, grey being dominant and white recessive (grey x grey and grey x white = grey, white x white = white). Sexes otherwise similar, but female 5–27% larger and up to c90% heavier; juvenile just separable on good view and

apparently moults direct into plumage similar to adult, though second-year still distinguishable by eye colour. **PERCHED Grey adult** All pale grey above and white below but for fine darker barring on tail and breast. **White adult** Entirely white, or occasionally with faint grey wash on primary tips. **Grey juvenile** Resembles grey adult but for slight brown wash on neck and coarser V-shaped bars on breast. **White juvenile** All white like adult (but see eye colour), or sometimes little faint barring on breast, or even some grey-washed dorsal feathers and faint wing- and tail-bars. **Bare parts** Adult eyes deep red, juvenile brown, turning yellowish-brown and, by second-year, orange. Adult cere and legs orange-yellow, juvenile yellow. **FLIGHT** Medium-sized raptor with accipiter proportions (p. 516), but relatively short and broad wings with rounded tips and short squared tail; wingspan 1.7 times total length. Flight fast, but action may appear shallower and more laboured than Brown Goshawk [119]; glides on bowed wings, but soars with slight dihedral and tail may be widely fanned. **Grey morph** All grey above; looks largely white below (including wing-linings) but for grey tinge to breast and ends of flight-feathers and faintly barred silvery undertail. **White morph** Entirely white. Juveniles not usually distinguishable from adults in flight, but see detail given above.

**CONFUSION SPECIES** In flight, white morph can look surprisingly like white cockatoo *Cacatua* (of comparable size but less powerful action, with longer wings and neck, shorter tail and legs, coloured crest or head markings, some colour on underwings). Upperparts of grey morph flying away not dissimilar to pale-backed Brown Goshawk [119] (relatively narrower wings, longer and more rounded tail, coloured underparts). Other species to be borne in mind include Grey Falcon [300] (short legs at rest, long wings reach tail-end and are narrow, pointed and black-tipped in quite different winnowing or flicking flight); Australian Black-shouldered and Letter-winged Kites [26, 27] (black shoulders and underwing markings, long pointed wings, short white tail, short legs, winnowing and hovering flight); and Pacific Baza [12] (longer wings with splayed barred primaries, slow flight, barred belly, short legs). (See also fig. 39 on p. 570.)

**VOICE** Usually silent except in breeding season. Like other accipiters, has various chattering noises, both rapid and slower, but most typical call is series of mellow, if rather nasal, upslurred ringing whistles, *kuwit kuwit...* or *kloore kloore...*, at rate of one per second (beware imitation by Spangled Drongo *Dicrurus hottentottus*).

**FOOD** Mainly birds, some smaller mammals, also

snakes, lizards, frogs, large insects, occasionally carrion; once freshwater crab. Commonest prey probably such birds as pigeons and parrots; also poultry and young megapodes; but, at least in Tasmania, male keeps to smaller species and insectivorous passerines, while female may tackle currawongs *Strepera* and even herons. Both sexes kill rabbits. Probably almost always still-hunts, gliding or dashing out from cover to catch passing or perched prey, which may be grasped in flight or snatched from ground or trees.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Aerial displays include single or mutual high-circling; slow-flapping with such exaggerated beats that wings seem almost to meet above and below body; and male flying just above female with talons extended. Perch-and-call also prominent.

**BREEDING** September–February in southeast Australia, but May–November/December in north. Flat nest of fine sticks, 50–60 cm across and c35 cm deep, lined with green leaves, at 9–35 m on lateral branch or in main fork of tall eucalyptus or other large tree. Clutch 3 (2–4). Incubation 31–34 days. Fledging c30–42 days, with further dependence 38–43 days.

**POPULATION** No measures of abundance. Said to be uncommon in south and northwest Australia; and from being once abundant in Tasmania has now declined there to estimated 110 pairs or fewer, with 2–3 pairs/100 km<sup>2</sup>. Elsewhere, although locally fairly common, generally at low density and, as total range covers less

than 1.5 million km<sup>2</sup>, population is hardly likely to exceed five figures. Human persecution and, particularly, forest clearance are obvious threats.

**GEOGRAPHICAL VARIATION** Dimorphic, with white morph alone in Tasmania and predominant in Victoria and north Western Australia; both morphs in more equal numbers in north Northern Territory, but grey much commoner (6–15:1) in Queensland and New South Wales. Species otherwise here considered monotypic. More usually treated as conspecific with Varied Goshawk [121] (Lesser Sundas to Solomons) – largely because both the Australian Grey and the mainland New Guinea race (*leucosomus*) of Varied have leucistic variants – and sometimes also with Grey-throated Goshawk [122] (Moluccas). But Grey far larger than the other two and lacks their rufous pigment; juveniles very different; no suggestion of intergradation; also, apparently, some behavioural and habitat differences. Here the three are treated as forming a superspecies.

**MEASUREMENTS** ♂ wing 240–272 mm, ♀ 286–330 mm; ♂ tail 166–204 mm, ♀ 205–241 mm; ♂ tarsus 64–75 mm, ♀ 75–88 mm. **Weights** ♂ 238–470 g, ♀ 530–990 g.

**REFERENCES** Amadon & Bull (1988), Aumann (1990c), Baker-Gabb (1985c), Blakers *et al.* (1984), Breerton & Mowney (1994), Burton & Alford (1994), Burton *et al.* (1994), Capper (1976), Capper & Capper (1981), Delrus (1994), Fleay (1950), Hollands (1984), Marchant & Higgins (1993), Mowney & Holdsworth (1988), Olsen (1994), Olsen & Maspley (1993), Olsen & Olsen (1985), Olsen *et al.* (1990, 1993), Stresemann & Amadon (1979), Wattle (1973), Wilson & Whelan (1993).

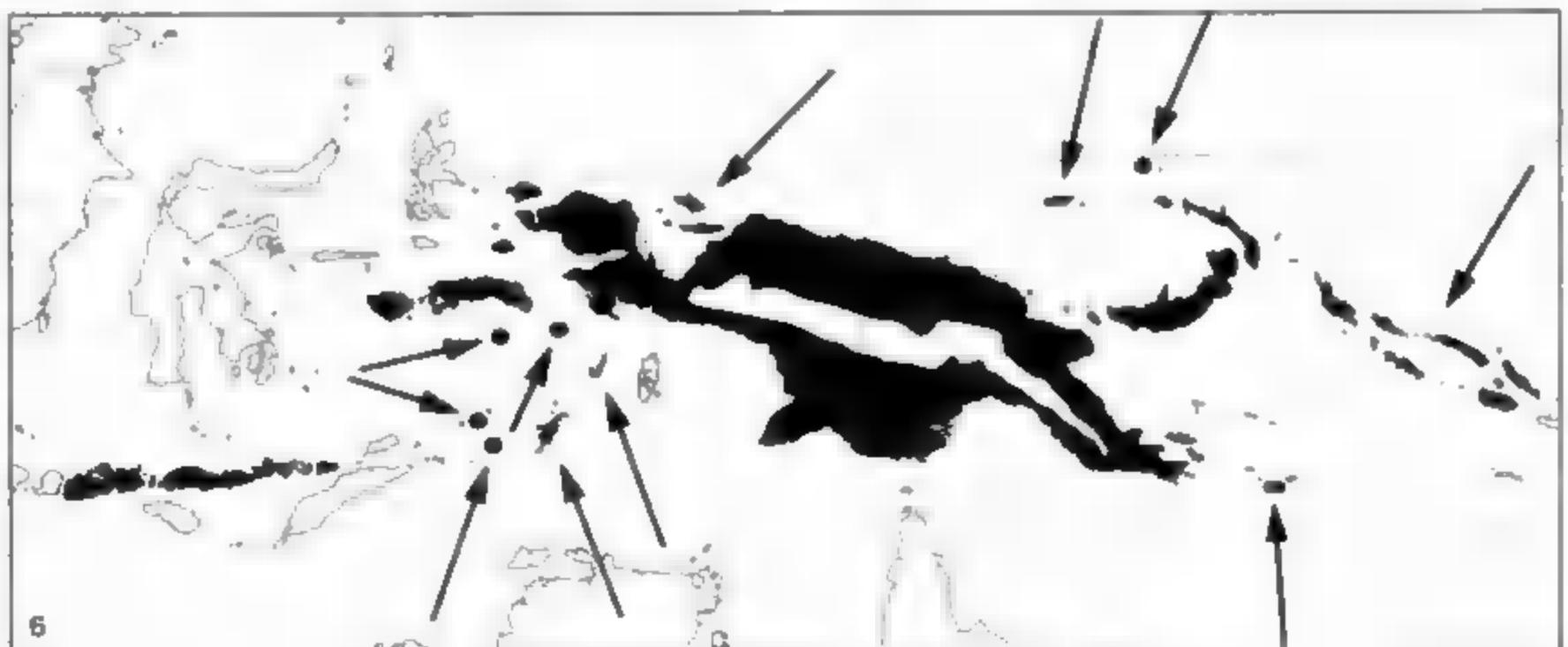
## 121 VARIED GOSHAWK *Accipiter hiogaster* (S Muller, 1841)

Plate 47

Other names: Vinous-chested or Rufous-breasted Goshawk or Hawk (different groups of races), Variable Goshawk, Papuanian Goshawk

**DISTRIBUTION** Australasian and, in intermediate Wallacea, marginally Indomalayan (0° to 12°S); order 6; widespread and often common. New Guinea and many islands of same latitudes west to Christmas Island and Lesser Sundas and east to Solomons; in Lesser Sundas,

Sumbawa to Alor (but not recorded Lombok, Suma, Wetar or Timor) and, farther east and north, Damar, Babar, Tanimbar and southern Moluccan groups of Buru, Ambon, Seram, Banda Besar, Kai and Aru; the Irian Javan islands of Misoöl, Sdawati, Waigeo, Numfor, Biak and Yapen; and the Papuan islands of Admiralty, New Hanover, New Ireland, New Britain, Umboi, Good-enough, Fergusson, Louisiades, Buka and Bougainville.



## 122 GREY-THROATED GOSHAWK *Accipiter griseogularis* (GR Gray, 1860)

Plate 47

**DISTRIBUTION** Australasian (3°N to 2°S); order 4; probably not uncommon. Endemic to northern Moluccas: Morotai, Halmahera, Ternate, Soa-Siu (Tidore), Bacan, Obi, and doubtless smaller neighbouring islands; possibly also Gebe.

**MOVEMENTS** Sedentary, so far as known, though presumably juveniles wander to some extent within islands.



**HABITAT** Forest and other wooded areas, perhaps coconut plantations. Sea-level to at least 1,200 m.

**FIELD CHARACTERS** Mid-sized accipiter, grey and rufous as adult, with heavy bill, short thick legs and toes, and somewhat rounded tail slightly longer than those of allospecies [120, 121]. Perches mainly inside canopy; short rounded wing-tips cover only tail-base. Sexes rather similar but distinguishable on good view, and female 14–26% larger; juvenile very distinct, and may not moult direct into adult plumage but pass through second-year stage.

**PERCHED Adult male** Uniform dark slate-grey to brownish-slate above, except for slightly paler head and more or less clear vinaceous-buff to rufous nuchal collar (sometimes mixed with grey); whole underbody same colour as collar, except for mottled grevish to pale grey throat. **Adult female** Rather browner above, with tendency to clearer collar; tail sometimes obscurely barred; darker rufous below with more distinct pale barring. **Juvenile** Dark brown above with lighter fringes, much white showing through on crown to mantle, and thin blackish bars on flight-feathers and tail; whitish to cream below with dusky-streaked face, broken blackish throat-stripe, heavily dark-streaked neck-sides and breast, redder-brown barred and V-marked abdomen and flanks, and more rufous-banded thighs. (At least some juveniles moult into plumage broadly resembling adult but with dark brown bars on lower breast and abdomen: this may be variant morph or second-year stage.) **Bare parts** Adult eyes pale orange-yellow, juvenile brown, turning yellow during first year. Male cere yellow, female and juvenile greenish-yellow. Adult legs yellow, juvenile greenish-yellow at first.

**FLIGHT** Smallish raptor with accipiter proportions (p. 516), but relatively short and broad wings with rounded tips, and slightly rounded tail; wingspan 1.7 times total

length. Fast beats interspersed with glides, but angle of wings not recorded. **Adult** More or less uniform dark grey to brown-grey above with slightly paler head and pinkish to rufous collar; and pinkish to rufous below, including wing-linings, apart from pale grey head, flight-feathers and tail. (Any barring on female's tail, abdomen and wing-linings unlikely to show except in ideal conditions.) **Juvenile** Rather pale-headed, and mottled above with dark and pale brown and white; tail thinly barred blackish; all creamy-white below, with heavy dark streaks on breast and forewings, dark bars on lower breast and rest of wing-linings, and fainter barring on flight-feathers, belly and tail.

**CONFUSION SPECIES** Two other accipiters endemic to Moluccas show similarities as well as differences. Moluccan Goshawk [127], of similar size but showing less RSD so that females relatively smaller, has proportionately longer tail and legs; adult bluer above, no collar, darker chestnut below; juvenile head similar to juvenile Grey-throated, but remainder more rufous in tone and all boldly barred. Moluccan Sparrowhawk [141] is small, with more pointed wings, short squared tail; adult has rufous collar but (particularly female) is less uniformly rufous-pink below; juvenile more rufous and barred above, and all sharply but thinly and neatly streaked below. The only remaining accipiters likely in Moluccas are Meyer's Goshawk [154] (clearly larger, relatively longer-winged and longer-tailed; adult black and white, or all black; juvenile mainly rufous-buff with thin dark streaks below) and, possibly as migrants during northern winter, the much smaller and very different Chinese and Japanese Sparrowhawks [115, 136].

**VOICE** Not described.

**FOOD** Apparently generalised feeder like Varied Goshawk [121], which it replaces in northern Moluccas, but no real information.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No descriptions of display-flights.

**BREEDING** No information.

**POPULATION** No data on densities, but apparently not uncommon in total range of some 40,000 km<sup>2</sup> (about half size of Ireland). By comparison with other accipiters elsewhere, population in at least upper thousands seems reasonable guess. Possibly more of a forest species than many races of Varied Goshawk [121], in which case likely to be at risk from tree clearance.

**GEOGRAPHICAL VARIATION** Often treated as conspecific with Grey and Varied Goshawks [120, 121], or more obviously with latter alone. Although certainly closely related, it combines extremes of size, tail length, grey throat and rufous collar that make it stand out from other pigmented forms of the *novae-hollandiae* super-species (see also p. 74) and suggest longer isolation; juvenile much more boldly marked; immature variant or second-year stage unique among this group. Three races.

*A. g. griseogularis* (Halmahera, Bacan and adjacent

islands) Largest; dark grey throat, rufous collar variably mixed with grey.

*A. g. mortyi* (Morotai, to north of Halmahera) Mid-sized; generally darker, but paler grey throat, clear-cut rufous collar.

*A. g. obiensis* (Obi, to south of Halmahera) Smallest and palest, with wide rufous collar.

The curious endemic goshawk of Christmas Island, *natalis*, usually treated as race of Brown Goshawk [119] but here placed with Varied Goshawk, is closer in size and quite similar in plumage to Grey-throated, even though the two are more than 2,500 km apart: there may be a case for treating it instead as a form of Grey-throated which has become isolated through extinction

of intervening populations of the increasingly arid Lesser Sundas, in parallel with the Moluccan Hawk-owl *Ninox squamipila* which has an isolated race, also *natalis*, on Christmas Island (see Carter, Debus, Garnett), or both may best be regarded as distinct species.

**MEASUREMENTS** *A. g. griseogularis* ♂ wing 217–241 mm, ♀ 251–280 mm; ♂ tail 164–183 mm, ♀ 194–217 mm. *A. g. mortyi* ♂ 207–222 mm, ♀ 236–251 mm; ♂ tail 156–167 mm, ♀ 181–193 mm. *A. g. obiensis* ♂ wing 191–200 mm, ♀ 231–241 mm; ♂ tail 144–151 mm, ♀ 178–185 mm. **Weights** No data.

**REFERENCES** Carter (1994), Debus (1994), Garnett (1992), Mees (1965), Wattel (1975).

## 123 BLACK-MANTLED GOSHAWK

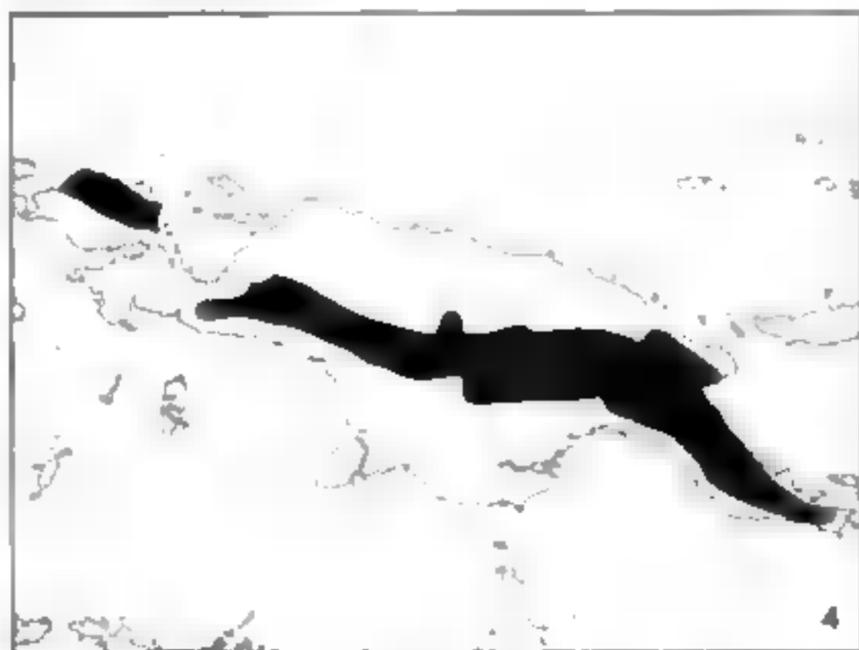
*Accipiter melanochlamys* (Salvadori, 1875)

Plate 44

Other name: Black-mantled Accipiter

**DISTRIBUTION** Australasian (0° to 10°S); order 4; often considered rare, but perhaps locally common. Endemic to backbone of New Guinea; from northwest promontory of Irian Jaya ('Vogelkop') to Huon Peninsula and Owen Stanley Range in southeast Papua.

**MOVEMENTS** Completely sedentary, so far as known, though juveniles presumably wander to some extent within mountain forests.



**HABITAT** Lichen-clad cloud forest, sometimes also foraging along forest edge, in secondary growth and through adjacent cultivated areas and gardens. Not found lower than 1,100 m, usually above 1,800 m and often much higher, up to at least 3,300 m.

**FIELD CHARACTERS** Mid-sized accipiter, black and rufous as adult, with medium-length wings, relatively short tail, and longish legs but short toes. Spends much of day perched within forest cover; wing-tips may extend to one-third down tail. Sexes similar, but female 9–22% larger and likely to be 15–25% heavier; juvenile very distinct.

**PERCHED Adult** Head and upperparts all glossy black to blackish-slate, apart from broad nuchal collar of rich deep rufous, which colour also extends over whole underbody; lower abdomen sometimes shows thin and

very faint whitish bars, and black throat may be white-streaked. **Juvenile** Largely dark brown to blackish-brown above with rufous edges, and obscure black bars on flight-feathers and tail, but black-blotched or striped whitish hindneck and upper mantle form distinctive collar behind mottled whitish face; all cream to pink-buff below, darkest on thighs, with bold blackish-brown streaks, drops and, on lower flanks, chevrons. **Bare parts** Adult eyes, cere and feet orange-yellow to orange, juvenile yellow. **FLIGHT** Smallish raptor with accipiter proportions (p. 516), but relatively short tail, and short and rather pointed tips to medium-length wings; wingspan 1.8 times total length. Fast beats interspersed with glides, but angle of wings not recorded. **Adult** All blackish above, apart from rufous collar, and rufous on underbody and wing-linings contrasting with black head and dark-tipped pale grey flight-feathers and tail. **Juvenile** Rather pale-headed and with black-blotched white hind-collar, otherwise mainly dark brown above; in contrast, quite pale below, being whitish but for slightly richer buff to rufous-buff underwings and thighs, all sharply dark-streaked on body, more finely so on wing-linings, and thinly barred on flight-feathers and tail.

**CONFUSION SPECIES** New Guinea has five other indigenous accipiters, but none is solidly black and rufous as adult or so evenly pale below as juvenile; four are also basically lowland species not found above 1,500–2,000 m. Grey-headed Goshawk [130] (mainly slate-grey and white) and Meyer's Goshawk [154] (much larger and black and white, or brown and rufous-buff) are quite different at all ages; latter is only other found at higher altitudes. Adult Brown Goshawk [119] and Collared Sparrowhawk [139] have pale rufous collar, but tend respectively to be larger (especially females) and smaller (especially males), as well as brown-slate above and barred rufous below, while juveniles much more densely barred and streaked below. Confusion perhaps most likely with New Guinea race (*leucosomus*) of Varied Goshawk [121], which is of similar size; usually lacking any trace of collar, adult is all grey or brown-grey above, with paler head, and vinous-rufous below; melanistic morph lacks chestnut underparts; variable juvenile, though usually streaked and barred below, lacks Black-mantled's

**juvenile** Blackish-brown above, streaked and barred rufous; some white on hindneck; creamy to pale buff below, with blotches or drops on breast and bars and arrowheads on abdomen. During earlier stages of moult to adult, may show dark grey hood contrasting with white throat. **Tawny juvenile** (believed to be juvenile of dark adult) Similar, but deep rich tawny or chestnut ground colour throughout. **Bare parts** Adult eyes usually deep yellow through orange to orange-red (dark morph deep pink-red), juvenile pale yellow, turning orange-yellow. Adult cere yellow-cream to bright yellow (dark morph sometimes more orange), juvenile yellow-green. Adult legs yellow to orange-yellow (dark morph more orange), juvenile greenish-yellow at first.

**FLIGHT** Smallish raptor with accipiter proportions (p. 516), but relatively long protruding head and pointed wing-tips, and medium-short tail; wingspan 1.8 times total length. Flight formerly described as 'light and slow' but this seems more likely to be display (see **Sociosexual Behaviour**); usually, fast beats interspersed with glides, but angle of wings not recorded; frequently soars or circles lazily, wings straight out. **Pied adult** Typically all blackish above, with or without rufous collar, and largely white below on body and wing-linings; underside of tail more or less plain grey, and of flight-feathers paler grey with blackish tips and finely barred white bases. **Dark adult** All blackish but for paler flight-feathers below and, in particular, silvery-based outer primaries. **Juvenile** Above, looks rich tawny or chestnut marked with blackish; below, body cream to chestnut (different morphs; see previous paragraph) with dark blotches on breast and chestnut bars on abdomen that all vary from dense to scattered in different races; undersides of wings and tail entirely washed pale tawny to pale rufous, wing-linings spotted and thinly streaked blackish, flight-feathers and tail very finely barred.

**CONFUSION SPECIES** Three other accipiters are found in Bougainville and main Solomons chain (excluding Rennell and Bellona), though none reaches Santa Cruz. Commonest is small grey-throated '*pulchellus*' group of races of Varied Goshawk [121], but this is easily distinguished (adult grey to slate above, but largely plain rufous underneath; juvenile less contrastingly rufous and black above, less evenly marked below, with more strongly rufous thighs and less barred tail), Meyer's Goshawk [154], although also black and white (with at least fine dark streaks) or all black as adult, is much larger and bulkier, and relatively longer-winged, as well as rarer, more local, and less easily seen; rufous juvenile much more finely marked below. (See also fig. 38 on p. 543.) More difficult is separation of collarless Pied from white-breasted morph of Imitator Sparrowhawk [129], a species formerly regarded as confined to Choiseul and Santa Isabel, but now identified north to Bougainville and apparently (a bird showing characters consistent with Imitator) south to Makira: black-breasted morph and finely barred juvenile present few problems, but white-breasted adult distinguished only by smaller size, rounder wings, blacker upperparts, red-brown eyes and, in flight, blacker undersides of flight-feathers and tail (but see **Geographical Variation**); legs (of males?) may also be rich orange-red.

**VOICE** Probably silent except in breeding season and then not particularly noisy. Calls variously rendered as

loud musical *ku-ku-ku...* rapidly repeated while soaring, and *ki-ki-ki...* like Northern Hobby [295] but rising and falling in volume. Variation of latter note, but dropping in pitch, also used by female when leaving nest.

**FOOD** Birds and nestlings, lizards, once a snake, large insects (including stick insects). Birds perhaps chiefly small passerines, but records of Duchess Lorikeet *Charmosyna margarethae* and Red-bibbed Fruit-dove *Ptilinopus viridis* snatched from vegetation, shore waders *Calidris* and Finsch's Pygmy Parrot *Micropsitta finschii* at least attempted, and rarely birds to size of poultry. Mainly still-hunts, 'moving a few tens of metres between perches every five minutes or so'; such perches often exposed and sometimes only 1-2 m high, others within tree canopy by clearings or gardens. Also forages in flight low over forest.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. High-circling, steep vertical dives and sky-dance noted from male of nesting pair; latter involved 'rollercoasting' with steep dives like stooping Peregrine Falcon [309]. In another aerial display, bird flew with exaggerated beats and wings pressed forward. Earlier description of flight as 'light and slow' (Sibley) may relate to form of slow-flapping display.

**BREEDING** Relatively few data. Nests with young in July on Santa Isabel and Guadalcanal and in September on Makira; specimens in breeding condition in September and December. One nest said to be far bulkier than that of Varied Goshawk [121]. Presumably many nests within forest, e.g. one 10 m up in crotch of limb, but others relatively open: one was  $\approx$  c20 m in riverside emergent, another at end of branch near base of crown of valley-side emergent, another in large spreading tree on side of ridge. Clutch size and incubation and fledging periods unknown.

**POPULATION** Older literature treats this species as uncommon and essentially confined to forest, though often seen in gardens in the southeasternmost Santa Cruz group in early 1960s. In 1973, Wattel concluded that it was scarce everywhere except on Makira and Santa Cruz and being steadily replaced by a more recent colonist, Varied Goshawk [121]. Subsequent observations on many islands north all the way to Bougainville, particularly since late 1970s, describe it as 'common', even 'abundant', and easily seen in various more open habitats, though especially in forest/garden mosaic at higher altitudes. Perhaps its now relative conspicuousness indicates that it is adapting to both forest clearance and interspecific competition. The islands total some 40,000 km<sup>2</sup>; in Europe such an area could hold over 5,000 breeding pairs of accipiters. Thus, it seems reasonable to propose a likely population at least approaching five figures in the whole region from Bougainville to Santa Cruz.

**GEOGRAPHICAL VARIATION** Complicated and polymorphic. Five races, three of which are often indistinguishable as adults but significantly different as juveniles. In addition, apart from variation in colour saturation of the upperparts, nominate subspecies has two (possibly three?) morphs, while most widespread race (*woodfordi*) has three when adult and two when juvenile; in both cases, more richly coloured juveniles

516), but relatively short and more pointed wing-tips and notably short tail; wingspan 1.8 times total length. Strong beats, at different times fast or leisurely, punctuated by brief glides on flat wings; also soars on level wings, tips slightly upcurved and fingered. **Adult** Plain grey above with slightly darker wing-tips, paler head, and pink to rufous collar; greyish-pink below with paler pinkish-cream (male) or darker pinkish-grey (female) wing-linings, silvery flight-feathers (but dark-edged primaries) and grey tail. **Juvenile** Dark brown above, variably edged rufous, with suggestion of pale collar; underbody cream to rufous-buff, strongly blotched and more barred on flanks, but wing-linings darker rufous and relatively thinly spotted and streaked; flight-feathers and tail thinly barred.

**CONFUSION SPECIES** Virtually none. Only other raptors in Fiji are Australasian Marsh Harrier [101] and Peregrine Falcon [309]. Adult unmistakable; juvenile much smaller than harrier, with quite different shape, flight and behaviour, and lacks pale rump.

**VOICE** Particularly noisy near nest and with fledged young, or in evenings. Various renderings include strident *ki...ki...ki...*, rapidly repeated *wit-wit-wit...*, and high thin accipitrine scream *shee-shee-shee...* followed or preceded by interrogative *querrk? querrk? querrk?...*

**FOOD** Diet apparently very varied: many small and medium-sized birds, especially introduced Common Mynahs *Acridotheres tristis*, but occasionally even as large as Peale's Pigeon *Ducula latrans* and chickens; also numerous insects, lizards and some snakes, introduced rats and mice, and some fish and crustaceans; carrion sometimes eaten by juveniles. Still-hunts from both hidden and more open perches; or forages with low, fast twisting flight, using any available cover to maintain surprise; also inspects tree crowns in slow flight. Described as dogged in pursuit, hurtling into bushes to beat quarry from undergrowth, and lurching at it with wings spread to block any escape. Prey taken in flight, from

trees or on ground; fish and shrimps or prawns snatched from shallow water.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, but family parties with fledged young noisy and conspicuous. High-circling noted, but no account of sky-dance. Otherwise, 'during courtship, a pair pursue one another, uttering a high-pitched piping sound and making shallow stabbing dives with the tail arched, so that they assume a striking V-shape'.

**BREEDING** Mostly August–December, exceptionally February–May. Crude and loosely constructed nest of large twigs, with some leaves, at almost any height up to c25 m in lightly foliated tree, often Leguminosae such as *Samanea* or *Albizia*. Clutch 2–3 (1–4). Incubation and fledging periods not documented.

**POPULATION** No information on densities, but one record of two active nests only 400 m apart, and generally regarded as common. Still much original forest on Vanua Levu, extensive pine plantations on Viti Levu, and widespread other exotic secondary growth elsewhere. Fiji totals 18,000 km<sup>2</sup> and, since this hawk occurs in almost any habitat with trees, and has no direct competitors, population in high thousands seems more than possible. Persecution frequent, however, though no information on effects on numbers.

**GEOGRAPHICAL VARIATION** Monotypic. Forms a superspecies with Black-mantled, Pied and New Caledonia Goshawks [123, 124, 126]. Formerly treated as race of Brown Goshawk [119].

**MEASUREMENTS** ♂ wing 194–207 mm, ♀ 230–243 mm; ♂ tail 135–146 mm, ♀ 166–176 mm; ♂ tarsus 52–56 mm, ♀ 60–66 mm. **Weights** ♂ 209 g (one).

**REFERENCES** Belcher & Sibson (1972), Blackburn (1971), Clunie (1972a/b, 1981), Clunie & Morse (1984), DuPont (1976), Holyoak (1979), Pratt *et al.* (1987), Watling (1982), Wattel (1973), Wood (1926).

## 126 NEW CALEDONIA GOSHAWK

*Accipiter haplochrous* PL Sclater, 1859

Plate 45

Other names: White-breasted or White-bellied Goshawk or Sparrowhawk

**DISTRIBUTION** Australasian (20°S to 22.5°S); order 4+; decreased but still common locally. Endemic to New Caledonia and its offshore islands.

**MOVEMENTS** Presumed to be sedentary, but juveniles may well be dispersive.

**HABITAT** Essentially forest and forest edge in both lowlands and hills, mainly humid evergreen but also secondary growth and montane forest. Not normally in more open country, but occasionally forages in savannah woodland and in 2–4 m high maquis, rarely even in dry forest, mangrove and cultivation. Sea-level to 1,300 m, but chiefly below 1,000 m.

**FIELD CHARACTERS** Mid-sized accipiter, black and white as adult, with heavy bill, short tail, long stout legs



but short toes. Little known, but presumably perches mainly within cover; wing-tips clearly exceed base of

short tail. Apparently dimorphic. Sexes similar, but female 9–25% larger and at least sometimes over 40% heavier; juvenile distinct, probably moults direct into adult plumage.

**PERCHED Normal adult** All virtually plain blackish-slate, darkest on crown and palest on throat and chest (which sometimes lightly stippled or barred whitish), but for sharply contrasting white abdomen, thighs and undertail-coverts. **White-chested adult** Individuals with whole throat and chest also white have been recorded, but are evidently rare. **Juvenile** Blackish-brown above, edged buff to rufous in fresh plumage, with paler streaky head and other light mottling; cream to pale buff below, with more rufous-tinged thighs, all heavily marked with dark streaks and drops on chest and with bars on abdomen.

**Bare parts** Adult eyes red, juvenile yellow. Cere yellowish to dusky. Legs yellow.

**FLIGHT** Smallish raptor with accipiter proportions (p.516), but relatively long pointed wing-tips and short tail; wingspan 1.8 times total length. Action not described; in general, presumably like other accipiters. **Adult** Black above and, except for contrasting blackish head and chest and dark grey wing-tips and tail, largely pale below: white abdomen, tail-coverts and wing-linings (rarely also throat and chest: see Perched), and silvery secondaries only very finely dark-banded. **Juvenile** Dark brown above, variously mottled, barred and rufous-edged, with paler streaky head and obscurely barred tail; below, body and wing-linings cream to buff, all heavily blotched and barred, looking darker than finely barred cream to greyish flight-feathers and tail.

**CONFUSION SPECIES** Only other accipiter of New Caledonia is Brown Goshawk [119], local race of which (*vigilax*) is smaller than nominate Australian: grey-headed, rufous-collared and brown-backed adult with rufous-banded underparts very different, but juvenile not dissimilar. Latter larger (though with overlap), longer-tailed, and would probably appear to have darker head and wing-tips, as well as showing less contrast between wing-linings and flight-feathers. Further, while adult New Caledonia Goshawk lives in forest, and Brown in bush and open grassland with scattered trees, dividing line between dispersive juveniles may be less clear. Only four other raptors occurring in New Caledonia – Osprey [8], Whistling Kite [40], Australasian Marsh Harrier [101] and Peregrine Falcon [309] – all unlikely to cause problems.

**VOICE** Not described.

**FOOD** Mainly lizards, grasshoppers, beetles and other insects, also small mammals (mice, rats), some birds. Birds apparently less important than formerly believed, but include rather larger species (parrots, pigeons,

poultry). Generally perch-hunts, but several accounts of fiercely chasing birds. Prey normally taken on ground, but about one-third on rocks, bushes and foliage and trunks of trees.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs. Aerial display seen but not described.

**BREEDING** Probably September–December; ariel display noted in September, nest-building and incubation at different sites in October. Stick nest in tall tree. Three eggs collected in the past in October, may or may not have formed a single clutch. Incubation and fledging periods unknown.

**POPULATION** Although mainland New Caledonia covers 16,390 km<sup>2</sup>, less than a quarter is now dense forest, whether lowland or montane. Much has been lost or damaged, initially through human settlement, then sandalwood logging and, later, opencast nickel-mining. Because of this goshawk's dependence on forest, it is clearly vulnerable, but densities of smaller raptors are often higher on islands than elsewhere. In 1987, Thiollay surveyed one hundred 1 km<sup>2</sup> plots across all habitats in New Caledonia and, for this species in forest, found an average of 1.66 birds/km<sup>2</sup>, while optimal habitats showed numbers as high as 5.69 birds/km<sup>2</sup> and, in one case, three pairs in a 20 ha patch of mature forest surrounded by pastures and savannah woodlands. Using his most conservative density figure of 1.33 birds/km<sup>2</sup> across all habitats, he calculated the population of this species at 2,500 pairs (and that of the local race of the open-country Brown Goshawk [119] at 1,950 pairs), but continued, 'If we add many areas of higher densities.... a more realistic figure may be at least twice these numbers.' There is no more recent information, but probably some continuing decline with deforestation. Even so, this goshawk is able to adapt to a certain extent to degraded forest, and to plantations and other secondary growth, so it seems likely that the total is still at least in the upper thousands and may possibly reach five figures.

**GEOGRAPHICAL VARIATION** Monotypic. Forms a superspecies with Black-mantled, Pied and Fiji Goshawks [123–125].

**MEASUREMENTS** ♂ wing 195–209 mm, ♀ 228–244 mm; ♂ tail 142–150 mm, ♀ 166–178 mm; ♂ tarsus 54–58 mm, ♀ 61–65 mm. **Weights** ♂ 152–218 g (three), ♀ 227–281 g (two); juvenile ♂ 168–172 g (four).

**REFERENCES** Anon (1974), BirdLife International (2000), Delacour (1966), de Naurois (1985), Ekstrom *et al.* (2000), Hannecart & Letocart (1980, 1983), Mavr (1945b), Sarasin (1917), Stokes (1980), Thiollay (1993a), Vuilleumier & Gochfeld (1976), Wauel (1973).

## 127 MOLUCCAN GOSHAWK

*Accipiter henicogrammus* GR Gray, 1860

Plate 43

Other names: Gray's Goshawk, Moluccan Banded Goshawk

**DISTRIBUTION** Australasian (3°N to 1°S); order 4; scarce to locally common. Endemic to north Moluccas: Morotai, Halmahera and Bacan; possibly also some off-

shore islands, but four specimens from Ternate mistrusted (White & Bruce).

**MOVEMENTS** Like other island accipiters, presumed to be sedentary, though juveniles may wander.



**HABITAT** Open primary hill and mountain forest, also at forest edge and in partly cleared areas, and now reported among secondary growth and old gardens in New Ireland. About 200 m (locally down to sea-level) up to 700 m at very least (and possibly much higher).

**FIELD CHARACTERS** Smallish accipiter, dark slate and creamy as adult, with particularly large bill, long thin legs but short toes, short rounded wings, and relatively short squared tail. Known only from dozen specimens and some recent sight records; perhaps perches mainly inside canopies, but one in New Ireland flew 'from one dead tree to another'. Sexes distinguishable, and female 7–10% larger; juvenile very distinct, possibly moults into immature stage before assuming full adult plumage.

**PERCHED Adult male** All dark slate-grey above with blacker crown and nape, but for slightly paler cheeks and bluer-grey mantle; and cream to pale buff below with faint greyish bars on chest. **Adult female** Browner above, again paler on mantle, with blackish crown and nape and dark grey cheeks; more buff below with rather clearer and browner bars on chest. **Juvenile** Dusky crown and nape, more or less edged rufous, but otherwise rather 'kestrel-like' pattern above, being predominantly tawny-rufous barred with blackish-brown; tail similar, with narrow dark bars and broader subterminal band; cream to pale buff below, all boldly barred brown to rufous, except for plain throat with thin median stripe. **Intermediate plumage** Much as adult, but wings and tail brown and, more notably, interscapular region barred or mottled tawny-rufous and brown; may be distinct immature stage. (Last originally described as adult female.) **Bare parts** Adult eyes orange-yellow, juvenile pale yellow. Adult cere yellow-orange to red-orange, juvenile oranges-yellow. Adult legs yellow-orange to orange-red, juvenile dull orange-yellow.

**FLIGHT** Small raptor with accipiter proportions (p. 516), but short rounded wing-tips and relatively short tail; wingspan 1.8 times total length. Action not described; in general, presumably resembles other accipiters. **Adult** All dark slate above; and mainly white to pale buff below but for grey cheeks, tail and distal halves of flight-feathers; slightly darker barring on flight-feathers and chest would probably not show. **Juvenile** Predominantly rufous-looking and 'kestrel-patterned' above, but for dusky head, and all barred below: cream wing-linings boldly barred with brown to rufous like body, and flight-feathers and tail tinged rusty and thinly barred with brown.

**CONFUSION SPECIES** Perhaps surprisingly for its size, New Britain holds four other accipiters, though confusion unlikely with much larger Meyer's Goshawk [154]. Two are endemic, little known and apparently rare. New Britain Goshawk [131] is superficially similar (including orange tone to all bare parts), perhaps at all ages, but clearly larger and stockier, with relatively longer and broader wings and much thicker legs; adult also paler above and whiter below; juvenile possibly less rufous, more dark brown above with pale scalloping, though still heavily barred below. New Britain Sparrowhawk [140] is also rather similar averages smaller, and has more pointed wings and relatively still shorter tail; adult with variably distinct rufous collar, grever underparts, and essentially yellow cere and legs; juvenile as rufous as juvenile Slaty-backed, but more blotched above and streaked below. Finally, there are local races (*dampieri* and *lavongai*) of the widespread Varied Goshawk [121]: adults paler and grever above and mainly pink to rufous below; juveniles much more uniformly brown above, less strongly barred below, and streaked on breast. Of these other four, the New Britain Goshawk is a montane species that probably does not occur below c750 m, while the Varied Goshawk is easily the most numerous and the only one typical of more open habitats, including degraded forest and secondary growth.

**VOICE** Adult in New Ireland flew excitedly from perch to perch uttering pinched *kek-kek*, not in continuous series like most accipiters but as paired notes. On other hand, immature male in New Britain called persistently with high-pitched *kee...kee...*

**FOOD** Rather weak feet and, for accipiter, comparatively small degree of RSD indicate that this not primarily a bird-eater. One specimen had 15 cm lizard in stomach.

**SOCIOSEXUAL BEHAVIOUR** Probably usually solitary, or in pairs. Aerial displays not described.

**BREEDING** Excited behaviour, perhaps indicating nesting, noted in New Ireland in late April. No other information.

**POPULATION** So little known that any conclusion must be pure speculation. New Britain with Umboi and southern New Ireland totals over 40,000 km<sup>2</sup>, but, except perhaps on Umboi (only 930 km<sup>2</sup>), Slaty-backed is everywhere considered uncommon and local. Thus, it might seem unsafe to assume numbers above three figures. The species is, however, regarded as 'unobtrusive and can be difficult to identify' (on anything but a really good view?), so much so that BirdLife International puts the adult population in the 2,500–10,000 range. (Yet this would amount to a density of one-fifth to nine-tenths as high as that of Northern Sparrowhawks [145] in Great Britain.) Deforestation must also be a serious threat: there is extensive logging in all lowland forest on these three islands and, though the species has been reported in cocoa plantations and old gardens, it is likely to succeed in such open secondary growth only where Varied Goshawks [121] are absent; it may also be replaced above c750 m by New Britain Goshawk [131].

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 185–195 mm, ♀ 209–214 mm; ♂ tail 139–150 mm, ♀ 160–166 mm; ♂ tarsus 56–58 mm, ♀ 63–65 mm. **Weights** ♂ 205–222 g.

barred or washed rufous below; very different adult entirely rufous below (or dark or white all over) and with yellow cere and legs. No problems likely with any plumage of Black-mantled Goshawk [123] (black and chestnut as adult, boldly blotched as juvenile), Brown Goshawk [119] or Collared Sparrowhawk [139] (both barred rufous below as adults, heavily streaked and barred as juveniles), or Meyer's Goshawk [154] (much larger and longer-winged, black and white or all black as adult, rufous-buff below as juvenile). Bürgers's Hawk [155], formerly placed in *Accipiter*, also quite different.

**VOICE** Only description relates to series of thin high upstrokes lasting 2.5–3 seconds, apparently more rapidly delivered than calls of other New Guinea accipiters.

**FOOD** Mainly lizards, also some small snakes, and insects and other arthropods. No evidence of taking birds (other than those caught in mist-nets), as would be expected from small feet and relatively little RSD. Still-hunts with rather slow movements.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary, occasionally in pairs. Stated not to soar (Coates), but complete lack of high-circling and other aerial displays would be surprising.

**BREEDING** Little information. Incubation recorded August–December, so young presumably sometimes still unfledged in January, even February. Relatively large, compact stick nest, lined with sprays of leaves; one nest was at c27 m in first main fork of tall remnant tree in village garden area that was site of active colony of Metallic Starlings *Aplonis metallica*; nest was 2 m from nearest starling nests. This held one egg, but no other data on clutch size or incubation and fledging periods.

**POPULATION** No information on densities and, like many accipiters, often under-recorded. New Guinea alone covers over 800,000 km<sup>2</sup> and, even though absent from highlands and perhaps rare in dense forest, this species has enormous areas of suitable habitat. Because it is often regarded as scarce (and, at best, only fairly common), a population of tens of thousands is suggested, but it could well be of six figures. Being adaptable to broken forest and cultivation, this bird seems unlikely to be threatened.

**GEOGRAPHICAL VARIATION** Forms a superspecies with New Britain Goshawk [131], which at one time was regarded as only a race. Otherwise apparently monotypic, but dimorphic to uncertain extent: dark adult apparently rare (only two described) and, though juveniles may be 'grey' or 'brown' above, it is unclear whether these represent colour morphs or geographical variation. The paler 'brown' juveniles may be confined to the western part of the range, where there is also a record of an intermediate, on Misool (see Wattel). Contrary to the adult state, however, the darker 'grey' juvenile appears to be the norm and thus it seems unlikely that the scarcer paler 'brown' juvenile becomes the rare blackish adult.

**MEASUREMENTS** ♂ wing 188–202 mm, ♀ 203–218 mm; ♂ tail 146–152 mm, ♀ 152–165 mm; ♂♀ tarsus 54–58 mm. **Weights** ♂ 180–283 g, ♀ 225–380 g.

**REFERENCES** Andrew (1992), Beehler *et al.* (1986), Bell (1984), Coates (1985), Diamond (1972, 1986), Gregory (1995), Harrison & Frith (1970), Mayr (1957), Mayr & Rand (1957), Peckover & Filewood (1976), Rand & Gilliard (1967), Wattel (1973).

## 131 NEW BRITAIN GOSHAWK

*Accipiter princeps* Mayr 1934

Plate 45

Other names: New Britain Grey-headed, Bismarck or White-breasted Goshawk

**DISTRIBUTION** Australasian (4°S to 6°S); order 3; probably very uncommon to rare. New Guinea area: apparently endemic to New Britain (second largest island of Papua New Guinea), but known only through five specimens from northeastern quarter, and a few sight records, so might conceivably be undiscovered in

adjacent New Ireland (cf. Slaty-backed Goshawk [128] and New Britain Sparrowhawk [140]).

**MOVEMENTS** Unknown, but perhaps fairly sedentary.

**HABITAT** Recorded only in primary hill and lower mountain forest. Mostly between c750 m and c1,450 m, but recorded up to 1,600 m and once down to 200 m; also an uncertain report at 50 m.

**FIELD CHARACTERS** Largish accipiter, slaty and white as adult, with very heavy bill, stout legs and short toes, short rounded wings and relatively short tail. Descriptions based on five specimens, all adults, collected in 1933 and 1969. Sexes apparently similar and female may be only 11–13% larger.

**PERCHED Adult** Entirely slate-grey above with darker wings and tail, paler sides of head and neck; all white below but for slight greyish wash or indistinct vermiculations on breast, particularly at sides. **Juvenile** Not certainly described (but see next paragraph). **Bare parts** Adult eyes bright orange to pinkish-orange, cere reddish-orange, bill-base and facial skin orange, legs yellow-orange.

[Bishop described possible juvenile as 'large, stocky and very powerful, reminiscent of the Northern Goshawk





short for accipiter. Sexes similar, but distinguishable on good view, and female 5–26% larger and perhaps 60% heavier; unusually among accipiters, juveniles barred below like adults (not streaked), but distinct and dimorphic, with (rare?) intermediates.

**PERCHED Adult male** Blackish-brown above, blackest on crown and nape, strongly tinged grey on mantle; tail with three grey-brown bands; white below, all covered with thin grey barring (densest on thighs), but for plain throat and mottled grey cheeks. **Adult female** Similar, but browner above, with grey-brown mantle; and creamier below, with browner barring. **Brown-morph juvenile** (commoner) Brown above, thinly edged rufous in fresh plumage, but crown again blackish; tail with whitish tip and four narrow grey-brown bands; creamys-white below with thin pale brown or, sometimes, tawny-rufous barring (or, rarely, buff or tawny below with diffuse darker tawny-brown barring); cheeks similarly mottled pale brown or rufous, throat plain creamy. **Rufous-morph juvenile** (much rarer) Crown still blackish, but elsewhere rufous feather-edges so broad that whole back and wings appear rufous with obscure brown spots and bars; tail also mainly rufous with four or five broken but bold black bands; buff or pale tawny below with thin darker rufous barring, all less sharply defined than on adults and brown morph; cheeks mottled rufous, throat plain. **Bare parts** Adult eyes red, juvenile orange. Cere yellow. Adult legs rich yellow, juvenile paler.

**FLIGHT** Tiny thrush-sized raptor with accipiter proportions (p. 516), but short pointed wing-tips and relatively very short squared tail; wingspan 1.9 times total length. Rapid shallow beats, interspersed with glides, but little seen in flight and no detailed descriptions of actions. (All plumages completely and narrowly barred below.) **Adult** Above, all dark with blacker crown and indistinct pale tail-bars (on good view, male's greyer mantle should show); below, body and wings all closely barred white and dusky-grey (male) or more cream and dusky-brown (female), except for white throat and rather uniform grey cheeks. **Brown-morph juvenile** Brown above with blacker crown and paler tail-bars; below, creamy body and axillaries closely barred brown or cinnamon-rufous, wing-linings plainer but suffused tawny or rufous, flight-

feathers and tail with sharper thin blackish bars. **Rufous-morph juvenile** All rufous above but for blackish crown and bold black bars on tail; and looks all tawny-rufous below, darkest on body, where closely barred, but for very fine black barring on quills.

**CONFUSION SPECIES** Size alone does not preclude confusion with other accipiters: females of this species overlap in measurements with the males of two more. Indeed, Semicollared Hawk [133] (subtropical upland endemic from southwest Venezuela to northwest Ecuador) has almost identical proportions (except for larger size, sex for sex, and relatively slightly longer tail), and very similar plumage ranges (except rufous juvenile apparently much the commoner); it can be distinguished, however, by its whitish to rufous nuchal collar, distinctly mottled cheeks and generally broader and less even barring below. Also overlapping in size are males of three Central and South American races of Sharp-shinned Hawk [147], but they are relatively longer-tailed and rounder-winged, with quite different adult plumages and juveniles that are streaked below (crissum also plain white or cream in all races and plumages). Other raptors that might be confused with adult Tiny Hawk, on plumage, include the only slightly larger but significantly longer-tailed Banded and Lined Forest-falcons [261, 262] and, very locally, the relatively short-tailed but uniformly grey-headed Plumbeous Forest-falcon [263]. Several more grey-and-banded birds of prey, from kites to buteonines and buteos, are all much larger, bulkier and mostly less secretive. Compare also juvenile Tiny Hawk with adult Double-toothed Kite [31].

**VOICE** Shrill *kee-ree-ree-ree...* or *keet-keet-keet...* are the only published descriptions.

**FOOD** Small birds; also rodents in stomach contents of one individual. Mainly still-hunts from concealed perches at various heights, at times changing these in quick succession. Individuals may specialise to some extent on hummingbirds (Trochilidae), learning their regular territorial perches and then trying to pick them off from ambush or in their rapid flight between.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Soars above forest, but no descriptions of aerial displays.

**BREEDING** Little known. In Panama/Colombia perhaps February–June, in south of range probably October–January; well-grown young in August in north-central Brazil. Nest of sticks; very few data, but one ‘in tall tree’, another in old nest of Black-collared Hawk [181]. Clutch 1–3. Incubation and fledging periods not recorded.

**POPULATION** Limits of distribution enclose some 6–8 million km<sup>2</sup>, but species seems nowhere common and is essentially restricted to forest edges and interfaces; even if assumed to be overlooked more than larger accipiters, a population of more than five figures appears unlikely.

**GEOGRAPHICAL VARIATION** Two races separated by northern Andes, but poorly differentiated, varying slightly in size and colour saturation, rather more in proportional tail length.

*A. s. superciliosus* (South America east of Andes) Slightly larger, paler, with more diffuse greyish barring below.

*A. s. fontanieri* (Nicaragua to west Ecuador) Slightly smaller, darker, relatively still shorter-tailed, with sharper, blacker barring below.

Juveniles of both races dimorphic, with intermediates, but brown morph much commoner than rufous in this case (cf. Semicollared Hawk [133], of which this is the still smaller and mainly lowland replacement). Tiny and Semicollared Hawks form a superspecies.

**MEASUREMENTS** *A. s. superciliosus* ♂ wing 134–147 mm, ♀ 155–170 mm; ♂ tail 94–104 mm, ♀ 114–120 mm; ♂ tarsus 40–43 mm, ♀ 45–49 mm. *A. s. fontanieri* ♂ wing

127–134 mm, ♀ 148–154 mm; ♂ tail 84–89 mm, ♀ 98–105 mm; ♂♀ tarsus 38–43 mm. **Weights** *A. s. fontanieri* ♂ 61.5 g (one, Salaman), c75 g (Stiles & Stiles), ♀ 115–134 g.

**REFERENCES** Amadon (1964), Blake (1977), Conover (1946), de La Peña (1992), Haverschmidt (1968), Hellmayr & Conover (1949), Hilty & Brown (1986), Marin *et al.* (1992), Meyer de Schauensee & Phelps (1978), Olrog (1985), Orti & Willis (1992), Reimsen & Ridgely (1980), Reimsen & Traylor (1983), Ridgely & Gwynne (1989), Salaman (1994), Sick (1993), Slud (1960, 1964), Stiles (1978), Stiles & Skutch (1989), Thiollay (1985b, 1989a/b, 1991a), Towain *et al.* (1992), Wattle (1973).

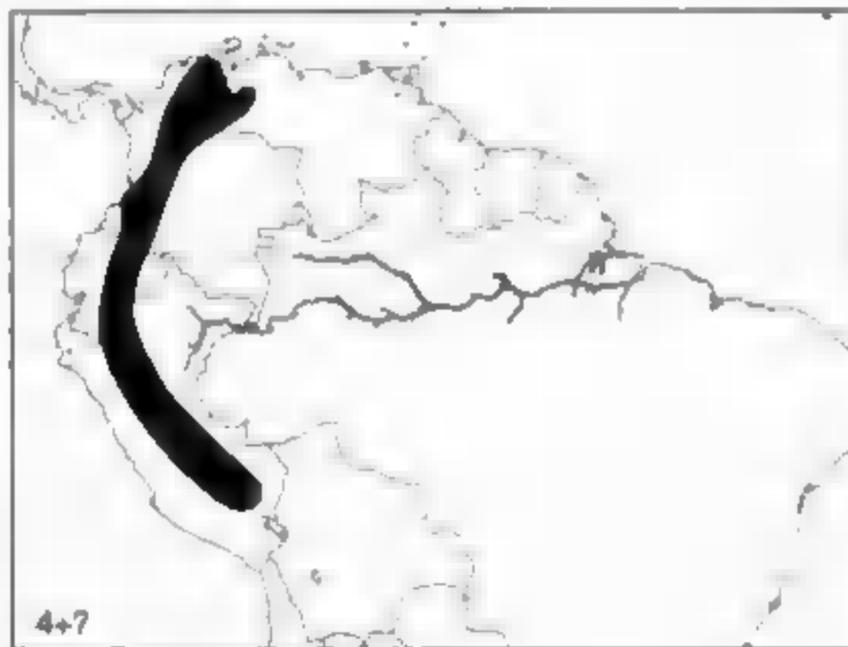
## 133 SEMICOLLARED HAWK *Accipiter collaris* PL Sclater, 1860

Plate 51

Other name: American Collared Hawk  
Proposed name: Semicollared Sparrowhawk

**DISTRIBUTION** Neotropical (11°N to 13°S); order 4+; little known and of restricted and apparently discontinuous range in subtropical montane forest, but locally considered not uncommon. Endemic Andean region of northwestern South America: long thought confined to southwest Venezuela (Tachira, Mérida) and, more importantly, western and central slopes of Colombia (Santa Marta, Norte de Santander, and Antioquia southwards) into northwest Ecuador (Imbabura, Pichincha, where very rare); now, however, located in at least two areas of Peru, the more southerly of which (Urubamba) represents range extension of 1,800 km from original known southern limit in Ecuador, making it likely that the species is patchily present in other places in between.

**MOVEMENTS** Probably fairly sedentary, but one record in east Andean Colombia (Meta) may perhaps represent wandering.



**HABITAT** Upper tropical and subtropical wet or humid premontane forest with clearings or adjacent open ground, even woodland close to farm buildings. Restricted altitudinally between 600 m and 2,200 m (thus overlapping, but mainly higher than, similar Tiny Hawk [132]); in Peru found between 1,700 and 1,950 m.

**FIELD CHARACTERS** Small to smallish accipiter, adults brown above with pale collar and barred below, but

juveniles showing much/some rufous, with relatively heavy bill, medium-length wings, shortish tail slightly rounded, and long legs and toes. Apparently secretive, perching within cover; wing-tips exceed tail-coverts. Sexes similar, and female 4–22% larger; juveniles barred below, unusually among accipiters (though like Tiny Hawk [132]), but still quite distinct from adults, and dimorphic with intermediates.

**PERCHED Adult** Sooty-brown above, with blackish crown and nape, whitish collar partly obscured by brown tips, and three grey tail-bands; creamy below, all boldly barred with chocolate-brown (broadest on flanks and thighs, much thinner on crissum), but for plain throat and distinctly mottled dusky-grey and white cheeks; female tends to be more coarsely barred than male. **Brown-morph juvenile** (rarer) Brown above (slightly paler than adult), thinly edged rufous in fresh plumage, with darker crown, indistinct whitish to rufous collar, and six blackish bands on greyer tail; creamy below with fairly broad yellow-brown to cinnamon barring; cheeks mottled pale brown or rufous, throat plain creamy. **Rufous-morph juvenile** (much commoner) Above, brown with broad rufous edges, or all rufous with indistinct dusky mottling, but blackish crown and nape, and clear paler tawny-rufous collar; tail rufous with six thin black bars; below, pale tawny-rufous almost obscured by coarse darker bars; cheeks rufous, throat whitish. **Bare parts** Adult eyes orange-yellow to orange, juvenile yellow. Cere and legs yellow.

**FLIGHT** Very small raptor with accipiter proportions (p.516), but short pointed wing-tips and rounded tail; wingspan 1.7 times total length. Flight not described.

**Adult** Above, all dark with blacker crown, obscure whitish collar, and grey tail-bars; below, body and wings all broadly barred cream and dusky-brown, except for whitish throat and mottled grey cheeks. **Brown-morph juvenile** Brown above with darker crown, obscure whitish to rufous collar, and thin black bars on greyer tail; creamy below with fairly broad yellow-brown barring, flight-feathers and tail with thin blackish lines. **Rufous-morph juvenile** Mainly rufous above but for blackish crown and thin black bars on tail; and looks almost plain tawny-rufous below, darkest on body, but for very fine black barring on quills.

**CONFUSION SPECIES** Most likely to be misidentified as far more widespread Tiny Hawk [132], a primarily

some of unidentified small accipiters seen on Palau probably this species; so, like Chinese Sparrowhawk, believed to be rare but regular winter visitor to Micronesia.

**HABITAT** Typically, open broadleaf and mixed forest (locally also pure coniferous), in southern taiga and subalpine zones, often along rivers and usually not far from water; and, in Nansei-shoto, subtropical evergreen forest; but in Japan has now adapted to urban parks and gardens, even in Tokyo. On migration and in winter, often in plantations and other secondary growth, native villages, and more open country where wooded areas or scrub mixed with paddyfields or marshland. Sea-level to 1,800 m, but mainly below 1,000 m.

**FIELD CHARACTERS** Tiny to small accipiter, as adult blackish-slate and grey-buff to rufous or brown-banded, with small bill, long pointed wing-tips, proportionately short tail, long slender legs and toes. Rather secretive in breeding season, tending to keep within cover, but may perch more openly in winter quarters; wing-tips nearly half down tail. Sexes different, and female also averages 15% larger (up to 27%) and perhaps 30% heavier (up to over 100%); juvenile distinct: as adult after first moult.

**PERCHED Adult male** Blackish-slate above, with grey to brownish-grey cheeks, often some whitish showing through on nape and, variably, white marks on scapulars; grey tail has three narrow blackish bands and broader subterminal; obscure dark shaft-streaks on white throat may form fine median stripe hard to see in field; otherwise, apart from white crissum, basically greyish-white below all patterned with slightly darker grey-brown barring and very variably washed with rufous, so that breast and flanks sometimes uniformly rufous (or hardly showing any). **Adult female** Brownish-slate above with blacker crown; throat-stripe slightly wider (but not clear as on Besra [137]); all barring below heavier, closer and darker grey-brown without any rufous wash. **Juvenile** Dark brown above, inconspicuously edged buff and rufous, with greyer cheeks, whitish supercilia and nape; tail much like adult's, with three thin bands and broader subterminal, but buff tip; all creamy-white below, with thin dark throat-stripe, rufous to brown streaks on breast, grading into bars on flanks and thighs, and spots on abdomen. **Bare parts** Adult male eyes orange to red, female yellow, juvenile brown (?). Adult cere and legs yellow, juvenile greenish-yellow.

**FLIGHT** Very small raptor with accipiter proportions (p. 516), and is smallest eastern Asiatic sparrowhawk, but has long pointed wing-tips, relatively short square-ended tail; wingspan 2.0 times total length. Dashing flight, and soaring flocks on migration, but action and wing positions not described in detail. **Adult male** Looks all blackish above with greyer cheeks, thinly dark-banded grey tail; below, apart from white throat (inconspicuous median stripe) and crissum, rather variable on body from predominantly plain rufous or tawny-buff on breast and flanks to faintly washed rufous or buff only at chest-sides, but otherwise indistinctly barred grey-brown, especially on flanks and axillaries, and much more strongly on wing-linings; flight-feathers and lateral tail thinly barred. **Adult female** Similar above, though more brownish-slate with slightly darker crown; but greyish-white below, all clearly and evenly barred with darker grey-brown on breast, belly, flanks, thighs and wing-

linings; no rufous wash, slightly more obvious throat-stripe, still white crissum, and flight-feathers and tail as male. **Juvenile** Dark brown above with greyish cheeks, whitish supercilia and nape, and thinly dark-banded greyer tail like adult; below, tail and flight-feathers much as adult, but otherwise all creamy-white with thin dark throat-stripe, broad red-brown streaks on breast and bars on flanks, and narrower closer dark brown bars on wing-linings, leaving belly (marked only with spots or thin broken bars) and thighs (thinly barred) all somewhat contrastingly whiter-looking (cf. Besra [137] but crissum plain creamy-white, or only flecked rufous, on both).

**CONFUSION SPECIES** Leaving aside island endemics encountered in winter quarters, this species has mostly to be distinguished from Chinese and Northern Sparrowhawks [115, 145] in breeding areas, and additionally from Shikra and Besra [113, 137] farther south. Among adults, points to look for include size (Japanese smallest, Northern largest, others in between, but extremes of RSD result in overlaps); wing shape (Besra short and pointed with folded tips seeming barely to exceed tail-coverts, but Northern long and rounded, others long and more pointed with wing-tips approaching half down tail); length of legs and toes (Shikra and Chinese rather shorter); tone of upperparts (mostly dark, but Shikra, some Chinese, and migratory race of Northern from northeast Asia all paler); dorsal central tail-banding (Shikra and Chinese absent, mainland Besra broadest, others in between); cheek colour (most grey, but Northern rufous, Northern female also pale supercilia); median throat-stripe (Besra strong, Japanese and Shikra inconspicuous, Chinese and Northern absent); underwings (Chinese plainest with very contrasting black tips, Shikra next with less contrasting tips and at least rufous-banded linings, Japanese and Northern extensively thin-banded, Besra more heavily); breast markings (Northern strongly barred rufous or brown, Shikra and female Japanese more narrowly, and mainland Besra streaked black on white in centre, while others more or less washed rufous with island Besra populations darkest and male Chinese often no more than pale buff); and tail-sides below (male Shikra and Chinese often plain, female Shikra and sometimes Chinese inconspicuously barred, Japanese and Northern thinly barred, Besra more broadly). But some of these distinctions are relative, and identifications should be based on several birds. Juveniles are much harder still: Northern has barred breast and Chinese often shows enough of adult underwing pattern (pale with plain linings, indistinct barring on remiges, contrasting dark outer primaries) to be distinct, while Besra's strong throat-stripe and Japanese's whiter belly can sometimes help in conjunction with shape and size, but usually, unless circumstances exceptional, juveniles unreliably distinguishable from those of Shikra and Besra.

**VOICE** Silent except when breeding. Main call chattering *kik-kik-kik...*, used in similar circumstances to corresponding call of Northern Sparrowhawk [145].

**FOOD** Mainly small birds, also many insects; some small mammals. Birds include sparrows (especially Tree Sparrows *Passer montanus* in suburban Japan), buntings *Emberiza*, tits *Parus*, warblers, nuthatches *Sitta* and occasionally larger such species as Azure-winged Magpie

Samar, Leyte, Bohol, Cebu, Negros, Guimaras, Siquijor, Mindanao).

**MOVEMENTS** Mostly sedentary, but at least partially migratory from higher altitudes in winter: some of Himalayan population descend to foothills and plains of north India (Punjab, Uttar Pradesh, Bihar) and Bangladesh; Chinese birds evidently move to lower ground of southeast (including Hainan) and into Indochina; and in Taiwan there is also a shift down from the mountains.

**HABITAT** Evergreen, mixed and moist deciduous mountain forest, often where broken by steep gulleys or interrupted by tracks, rivers, cultivation or other open patches; also plantations and other secondary growth and, in winter, locally in groves of trees in lowland plains. Mostly 300 m to 2,200 m, but locally to 3,100 m (and May records from Nepal at up to 3,440 m), as well as down to sea-level in mangroves in Andamans; lower in winter from India to Taiwan.

**FIELD CHARACTERS** Tiny to smallish accipiter, as adult blue-grey to slate-grey and rufous or more or less barred, with small bill and head, short wings, short tail (medium-length in 'affinis' group: see Geographical Variation), long slender legs and toes. Generally secretive, tending to keep within cover, but in early morning also 'often seen perched on tall dead trees on the verge of evergreen jungle' (Ali & Ripley); wing-tips less than one-third down tail (and barely exceed coverts in peninsular India and island races). Sexes distinguishable, and female also averages 16–24% larger (different populations), biggest being 40% larger and probably at least 68% heavier than smallest males; juvenile distinct; as adult after first moult.

**PERCHED Adult male** On mainland, generally blackish-brown to blackish-slate above (but paler greyish-slate in peninsular India: see Geographical Variation), often with whitish showing through on nape, sometimes white spots on scapulars, and three broad dusky bands and still broader subterminal on grey tail; below, prominent dark median stripe on white throat, and faint moustachial streaks; cinnamon-rufous chest and flanks, centre of former more or less divided by dusky-streaked white patch; lower breast and belly, also thighs (but see Geographical Variation in island races), more or less barred white and cinnamon-rufous, but crissum plain white. **Adult female** Broadly similar pattern, but browner above with blackish crown and nape, apart from dusky-banded greyish tail; median throat-stripe even broader than on male, and streaks on chest blacker and more prominent, forming characteristic combination with rufous-brown bars on lower breast and belly. **Juvenile** Dark brown above, edged rufous, and with rufous cheeks, whitish supercilia and nape; tail much like adult's, but banded dark and light brown; all creamy-white below, with dark throat-stripe and sharply defined dark brown streaks on breast, bars on flanks and thighs, and spots on abdomen (island populations more buff with more suffused dark brown markings); crissum plain or flecked rufous. **Bare parts** Adult eyes yellow to orange-yellow, juvenile green-grey, turning yellow. Cere greenish-grey to yellow. **FLIGHT** Very small raptor with accipiter proportions (p. 516), but short pointed wing-tips, relatively short tail

(longer in 'affinis' group: see Geographical Variation); wingspan 1.8 times total length. Action and wing positions not described in detail, but frequently soars high. **Adult male** Looks blackish above with paler cheeks, rather evenly banded tail; below, white throat with conspicuous median stripe; cinnamon-rufous breast and flanks mottled white and streaked blackish in centre of chest and more or less barred white on central lower breast and belly; whiter wing-linings with pale rufous wash and brown to blackish bars; crissum plain white; greyish quills, whiter on basal two-thirds of flight-feathers, with rather broad dusky barring. **Adult female** Similar above, though blackish crown and nape show up against browner-looking back and wings; below, diagnostic combination of broad median throat-stripe, blackish streaks on chest (fanning out as extension of throat-stripe) and rufous-brown barring on lower breast, belly and wing-linings; white crissum, and flight-feathers and tail as male. **Juvenile** All dark brown above with rufous tinge, apart from rufous cheeks, whitish supercilia and nape, and broadly banded tail; all more or less creamy-white below, with dark throat-stripe, streaks on breast, spots on belly, bold broad bars on flanks and thighs, and narrower bars on wing-linings; quills as adult's, except that bars on flight-feathers and lateral tail narrower.

**CONFUSION SPECIES** Adult male pattern of streaks and bars characteristic. Combination of white underbody with dark throat-stripe, streaks on central chest and bars on belly distinguishes adult female from all sympatric accipiters except Crested Goshawk [109] (distinct crest when perched, and generally larger, clearly more thickset, with heavier bill). But, in much of range, care necessary in separation from others of comparable size: Shikra [113] and, chiefly during northern winter, Chinese [115], Japanese [136] and Northern Sparrowhawks [145] (see discussions under all four). *Besra* is easily shortest-winged and, except in some island races, has fewer and broader bands on tail (light and dark of almost equal width) than all the rest, as well as broader bars on flight-feathers. Among adults, it is darker above than Shikra, most Chinese, and relevant migratory race of Northern; and is only one with broad median throat-stripe (thin and inconspicuous on adult Shikra and Japanese), but beware that juveniles of Japanese, Chinese and especially Shikra also all have a throat-stripe, though only Shikra's is as broad as *Besra*'s. Juveniles are very difficult: Northern has barred breast; Chinese rather plain linings, indistinct barring on flight-feathers and contrasting dark outer primaries; Japanese much thinner throat-stripe, narrower bars on quills, and whiter-looking belly; but juveniles of Shikra and *Besra* usually unreliably distinguishable in field (though Shikra less rufous-edged and more uniformly brown above, also with five to seven dark tail-bars, rather than four to five).

**VOICE** Loud squealing *ki-woer* or rapidly repeated *tcheu-tcheu-tcheu*. 'noisy, pairs calling often to one another', but this may be in breeding season only (?) and second of above calls attributed elsewhere to hungry young.

**FOOD** Mainly birds; but also small mammals, lizards, insects. Recorded birds are mostly passerines from warblers to thrushes, but also barbets (Capitonidae)

## 138 SULAWESI SMALL SPARROWHAWK

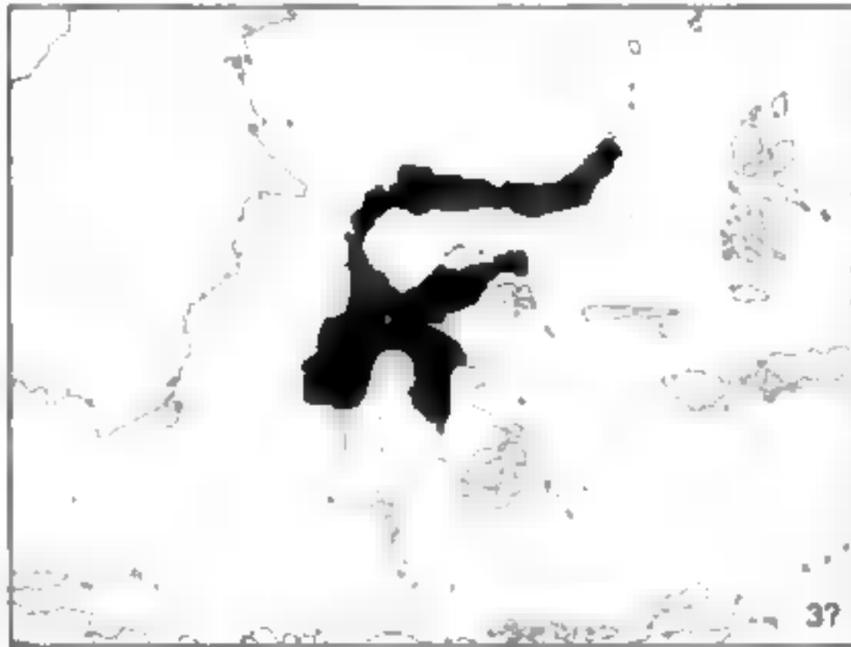
*Accipiter nanus* (Blasius, 1897)

Plate 42

Other names: Sulawesi or Celebes Little or Dwarf Sparrowhawk

**DISTRIBUTION** Indomalayan, in intermediate Wallacea (2°N to 4°S); order 3 $\frac{1}{2}$ ; evidently scarce to rare, with few recent records, but probably under-recorded. Central Indonesia: endemic to mainland Sulawesi (except less mountainous ends of both southern promontories) and eastern Buton.

**MOVEMENTS** Likely to be sedentary.



**HABITAT** Mountain and hill forest. Perhaps mainly 900 m to 2,250 m, rarely down to 550 m.

**FIELD CHARACTERS** Tiny to very small accipiter, as adult mainly blue-black and rufous or cinnamon to grey, with relatively heavy bill, short wings, comparatively short square-ended tail, long thin legs and toes. Secretive and hard to see, perching entirely within cover; wing-tips probably do not exceed tail-coverts. Sexes rather similar, but possibly distinguishable in good view, and female averages 11% larger (probably no overlap, up to 21%); juvenile distinct; as adult after first moult.

**PERCHED Adult male** Much of description of adult Spot-tailed Sparrowhawk [118] would apply here, except for bare-part colours (see below) and tail pattern, which is obscurely barred dark grey and blackish-grey with no white tip but three white spots on inner webs of 12–4 only (forming broken paler bars in middle of each side when spread, but lacking white in centre); also, crown less blackish, scapulars show little or no white, throat more grey-streaked, abdomen and thighs washed greyer.

**Adult female** Duller above and, in particular, breast more cinnamon (not rufous). **Juvenile** Again, much of description of juvenile Spot-tailed would apply, except for bare-part colours (see below), rufous tail with three to four blackish bands (no white tip or spots), and perhaps more constantly cream underbody with sparser but bolder blackish streaks extending more down flanks; primaries more obviously blackish with only rufous edges.

**Bare parts** Adult eyes yellow-orange to orange, juvenile yellow-green. Adult cere yellow-green, juvenile duller. Adult legs yellow-orange to orange, juvenile pale yellow.

**FLIGHT** Tiny raptor with accipiter proportions (p.516), but short rounded wings, relatively short square-ended

tail; wingspan 1.9 times total length. Flight described as fast and agile among trees. **Adult** More or less black above, with greyer head, apart from obscurely barred tail with three white spots on some lateral feathers (forming broken paler bars in middle of each side when spread, but not across centre); predominantly greyish below, including grey-streaked whitish throat, grey-washed lower abdomen (though crissum white) and grey-mottled buff underwings, but breast vinous (male) to cinnamon (female), remiges strongly blackish-barréd, and some broken white showing on greyish tail. **Juvenile** Mostly bright rufous above, apart from streaky brown head, black bars on primaries, dusky subterminal marks on uppertail-coverts (giving effect of spotted rump) and clear black bands on tail; below, bold sparse blackish streaks on creamy breast and flanks, much finer streaks on rufous-washed wing-linings, and thin barring on rusty-grey flight-feathers and tail.

**CONFUSION SPECIES** Adult very similar to adults of two other (not closely related) Sulawesi endemic forest accipiters, all of which hard to see (though attracting attention by different calls): Spot-tailed Sparrowhawk [118] (rounded and proportionately longer tail with white tip and two to three spots on central feathers as well, whiter abdomen and thighs, thicker yellow legs with short toes, orange cere and, in flight, much whiter underwings) and male Vinous-breasted Sparrowhawk [142] (no tail-spots, yellow eyes and legs, much greater RSD so females clearly bigger and, in flight, more strongly mottled wing-linings, less strongly barred flight-feathers). Juvenile Spot-tailed Sparrowhawk also rather similar to juvenile Sulawesi Small, but eyes grey-brown, cere brown, tail more or less black with white tip and central spots and rufous edges, breast and flanks more thinly streaked, and, in flight, wing-linings almost plain, flight-feathers much more thinly barred. Juvenile Vinous-breasted also rufous, but entirely blackish-spotted and barred above, and thighs spotted. See also description sections of all three, and Confusion Species under the other two: under Spot-tailed are comparisons with three more Sulawesi accipiters: Sulawesi Crested Goshawk [110] (notably juvenile male) and migrant Chinese and Japanese Sparrowhawks [115, 136].

**VOICE** Said to be quite vocal. Thin high *kilia* repeated at intervals; sometimes followed by 'extraordinarily sharp and rapid' *ki-ki-ki-ki...*, higher-pitched than Vinous-breasted Sparrowhawk [142] (B&A).

**FOOD** Little known. Large insects, especially grasshoppers; possibly small birds and young poultry; once small snail. Almost nothing known of hunting behaviour, but dashes through forest, possibly relies on surprise.

**SOCIOSEXUAL BEHAVIOUR BEHAVIOUR** Solitary or in pairs. Remains in dense cover; no account of any displays, aerial or otherwise.

**BREEDING** Only one nest recorded and even that only 'probably' of this species. Small flattish structure of sticks near main trunk of small tree, located in June, but then predated egg found below nest in early August.

**FIELD CHARACTERS** Small to smallish accipiter, blackish, grey and rufous as adult, with fairly heavy bill, long thin legs and toes, relatively pointed wing-tips and very short tail. Sexes similar, but female may be nearly 20% larger; juvenile distinct. (Coates has suggested that juvenile moults into distinct immature stage, but his field identification was based on combination, with immature plumage, of rufous collar, barred breast and dark red eyes not found in any other known New Britain accipiter: in view of paucity of knowledge of that island's raptors, perhaps description may refer to moulting juvenile of as yet undescribed species?)

**PERCHED Adult** All plain dark slate above, with blacker crown and greyer cheeks, apart from bright rufous nuchal collar; mainly pearl-grey below, shading into white crissum, but throat greyish-white and sides of chest tinged rufous. **Juvenile** Rufous above, with blackish blotches from dusky feather-centres and dusky bars on slightly grey-tinged tail, but crown blacker with narrow rufous edges and some white showing through, particularly on nape; cream to pale buff below with broad and diffuse brown streaks, these becoming drops and arrowheads on abdomen and wavy bars on thighs. (Supposed immature stage dark brown above with darker bars, indistinct on tail, but dark brownish-grey head and rufous collar; white below, barred rufous on breast [and wing-linings] but not abdomen.) **Bare parts** Adult eyes dark red, juvenile brown. Adult cere greenish-yellow, juvenile greenish. Adult legs yellow to orange-yellow, juvenile paler yellow. (Supposed immature had dark red eyes and, unexpectedly, orange cere and legs.)

**FLIGHT** Small raptor with accipiter proportions (p. 516), but short and relatively pointed wing-tips and, for this genus, exceptionally short tail; even so, wingspan only 1.8 times total length. Action not described. **Adult** All blackish-slate above with rufous collar; and largely grey below, mottled dusky on wing-linings, with slightly darker plain grey tail, contrasting white undertail-coverts, and whitish-barréd flight-feathers tinged rufous at base. **Juvenile** Very rufous above, blotched and barréd blackish, with dark head; buff-white below with heavy brown streaks, narrower on wing-linings, and flight-feathers and tail pale rufous with thin dark bars.

**CONFUSION SPECIES** Combination of blackish and grey with rufous collar, as well as red eyes and yellow legs, should be unmistakable, while very rufous juvenile is also distinctively streaked below. Four other accipiters are found in New Britain, though this and New Britain Goshawk [131] so little known that as yet undescribed accipiters may well still await discovery in this or other

forested parts of the Indonesian and Papuan area, where nearly 30% of all accipiters are endemic. Of these, Slaty-backed Sparrowhawk [128] is most similar in size and pattern, but has more rounded wings, slightly longer tail, creamier underparts, richly orange eyes and legs, and no rufous collar, while juvenile 'kestrel-patterned' above and heavily barréd rufous and brown below. Not dissimilar in appearance, at least as adult, New Britain Goshawk is clearly larger, paler above and white below, again with orange eyes and legs. The last two species, New Britain race (*dampieri*) of widespread Varied Goshawk [121] (adult pale grey and pink, juvenile brown above, streaked and barréd below) and much larger and longer-winged Meyer's Goshawk [154] (adult black and white, usually somewhat streaked and barréd below, or all black, juvenile dark brown above, edged rufous, and all rufous-buff below with sparse narrow dusky streaks), should present no difficulties.

**VOICE** Not described.

**FOOD** Not recorded, but foot structure and considerable degree of RSD indicate bird-eater.

**SOCIOSEXUAL BEHAVIOUR** Probably solitary or in pairs. No description of displays.

**BREEDING** No information.

**POPULATION** Though provisional order of magnitude here put in upper hundreds, this rather small forest accipiter could well be somewhat less rare than supposed and, indeed, BirdLife International suggests that it may belong in the 1,000–2,499 range. Extensive logging (often followed by planting of oil palms) is destroying its lowland habitats, but the montane forests are not apparently threatened. Its recent detection in southern New Ireland raises the possibility of further discoveries in both islands. The New Britain population is known from a few records 'up to at least 900 m', but perhaps the higher montane forests have not been adequately surveyed. The two islands have a combined area of over 50,000 km<sup>2</sup>, with significant sections above 1,000 m.

**GEOGRAPHICAL VARIATION** Monotypic. Forms a superspecies with Collared and Moluccan Sparrowhawks [139, 141].

**MEASUREMENTS** ♂ wing 173 mm (one), ♀ 202–205 mm (two); ♂ tail 123 mm (one), ♀ 139–148 mm (two); ♂♀ tarsus 54–63 mm (three). **Weights** No data.

**REFERENCES** Beehler *et al.* (1986), BirdLife International (2000), Coates (1985, *in litt.*), Collar & Andrew (1985), Diamond (1971), Schodde (1978), Wattel (1975).

## 141 MOLUCCAN SPARROWHAWK

*Accipiter erythrauchen* GR Gray, 1861

Plate 43

Other names: Rufous-necked, Grey-throated Sparrowhawk

**DISTRIBUTION** Australasian (5°N to 4°S); order 4; apparently not uncommon. Endemic to Moluccas, including Morotai, Halmahera, Bacan, Obi, Buru, Ambon and Seram.

**MOVEMENTS** Presumably sedentary, though juveniles may wander.

**HABITAT** Primary forest in both lowlands and hills, including partly cleared areas; has also adapted to some plantations. Sea-level to 1,400 m. (Description by

Bowler & Taylor of apparently collarless, chestnut-throated, flank-banded and orange-cereed accipiters, seen hunting along forest edge and adjacent gardens and timbered creeks at 650–850 m on Seram, does not fit this species.)



**FIELD CHARACTERS** Small to smallish accipiter, blackish and rufous as adult, with fairly heavy bill, very long slender legs and toes, relatively pointed wings and short tail. Sexes rather similar, but female 13–28% larger; juvenile very different.

**PERCHED Adult** Dark slate-grey to slate-black above, with clear dark rufous nuchal collar, very faintly barred tail; apart from dusky-speckled whitish throat, rufous-pink below shading to greyish on lower abdomen, or pale warm grey with pink flush only on chest (see Geographical Variation). (Females slightly darker above and greyer below.) **Juvenile** Blackish-brown above with variable rufous edges, particularly on hindneck, where white showing through helps to emphasise strong suggestion of rufous collar; tail closely barred; cream below with bold brown streaks, but only thin dark shaft-streaks on whiter throat. **Bare parts** Adult eyes yellow, juvenile duller. Adult cere and legs greenish-yellow, juvenile greener.

**FLIGHT** Small raptor with accipiter proportions (p. 316), but short and relatively pointed wing-tips and short tail; wingspan 1.9 times total length. Action not described; presumably resembles other accipiters. **Adult** All blackish above but for rufous collar; below, rufous-pink to pale grey body with whiter throat and undertail-coverts all paler than barred grey-rufous wing-linings and bases of outer primaries, and otherwise obscurely barred grey flight-feathers and tail. **Juvenile** Black and variably rufous above, including strongly barred flight-feathers and tail, with paler collar; below, cream body with bold dark streaks and barred axillaries, and otherwise darker rufous-grey, flecked on wing-linings and thinly but clearly barred on flight-feathers and tail.

**CONFUSION SPECIES** Needs to be distinguished from four other Moluccan accipiters. Much larger and more contrasted Moluccan Goshawk [127] (adult blue-slate and chestnut with no collar, juvenile patterned with white above and barred below) and Meyer's Goshawk [154] (adult black and white, usually somewhat streaked and barred below, or all black, juvenile all rufous-buff below with sparse narrow dusky streaks) present no problems. The other two, which replace each other geographically, are closer in size but should be readily distinguishable: in north Moluccas, Grey-throated Goshawk [122] (adult with grey head and back, and rufous collar and underparts, juvenile whitish-headed, only faintly edged buff above, streaked on chest and barred on abdomen); and, in south Moluccas, very different local races (n nominate *hiogaster* and *pallidiceps*) of widespread Varied Goshawk [121] (on Seram and Ambon, adult all slate above and chestnut below, juvenile white below with scattered dark spots, but on Buru adult head and mantle entirely pale grey).

**VOICE** Not described.

**FOOD** Apparently small birds: seen chasing Red Lory *Erythroneura*, and both foot structure and high degree of RSD indicate bird-eater. Still-hunts from concealed perch.

**SOCIOSEXUAL BEHAVIOUR** Probably solitary or in pairs. No description of aerial displays.

**BREEDING** No information.

**POPULATION** No data on numbers. Moluccas total over 80,000 km<sup>2</sup>, an area about size of all Ireland (where 11,000 pairs of Northern Sparrowhawks [145] estimated in early 1990s), but small tropical forest accipiters appear to occur at rather low densities. Thus, population of only thousands is suggested here. Surely threatened by deforestation.

**GEOGRAPHICAL VARIATION** Two races.

*A. e. erythrauchen* (northern Moluccas) Smaller; dark slate above, mainly pink below; juvenile narrowly edged rufous above.

*A. e. ceramensis* (Seram, Buru, adjacent islands) Larger; blacker above, greyer below; juvenile more broadly edged rufous above. Forms a superspecies with Collared and New Britain Sparrowhawks [139, 140].

**MEASUREMENTS** *A. e. erythrauchen* ♂ wing 162–171 mm, ♀ 193–208 mm; ♂ tail 120–127 mm, ♀ 148–158 mm; ♂♀ tarsus 50–61 mm. *A. e. ceramensis* ♂ wing 177 mm (one), ♀ 210–215 mm. **Weights** *A. e. ceramensis* ♂ 156 g (one).

**REFERENCES** Andrew (1992), Bishop *et al.* (1994), Bowler & Taylor (1989), Stresemann (1914), van Dedeem (1911), Wattel (1975), White & Bruce (1986).

## 142 VINOUS-BREASTED SPARROWHAWK

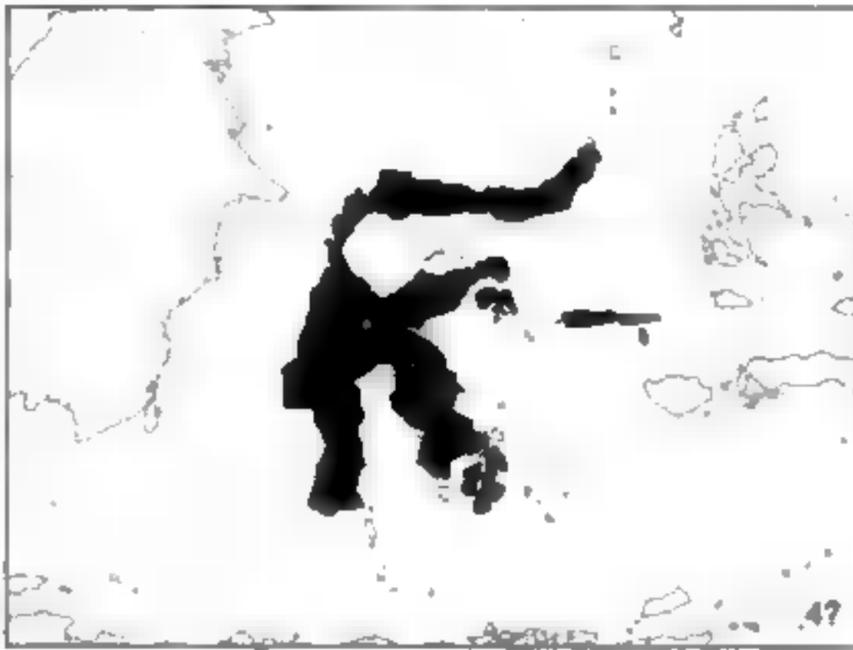
*Accipiter rhodogaster* (Schlegel, 1862)

Plate 42

**DISTRIBUTION** Indomalayan, in intermediate Wallacea (2°N to 6°S); order 4?; widely scattered within limited range, apparently uncommon but probably under-recorded. Central Indonesia: endemic to Sula-

wesi and various associated islands, including at least Peleng, Banggai and the Sula group (Taliabu, Mangole, Sulabesi) to east, as well as Muna and Buton to south-east.

**MOVEMENTS** Generally presumed to be sedentary, but ancient ancestors evidently made sea crossings, as 'the Sula and Banggai islands were never connected to Celebes (Sulawesi) and 'the intermediate characters of *A. s. sulaensis* (see Geographical Variation) point to a colonization of Celebes by using the Sula Archipelago as stepping stones' (Wattel).



**HABITAT** Lowland and mountain forest, and dense mangroves, but including forest edge, secondary growth, vicinity of forest villages, even broken country with scattered woods. Sea-level to 2,000+ m, thus fully overlapping with Spot-tailed and Sulawesi Small Sparrowhawks [118, 138].

**FIELD CHARACTERS** Small to small-medium accipiter, as adult mainly black and rufous to grey or white, with short wings, comparatively short square-ended tail, long thin legs and, notably, toes. Little seen, perching almost entirely within cover; wing-tips probably do not exceed tail-coverts. Sexes rather similar, but possibly distinguishable in good view, and female averages 23% larger (no overlap, up to 35%); juvenile distinct; as adult after first moult.

**PERCHED Adult male** Much of description of adult Spot-tailed Sparrowhawk [118] would apply here, except for bare-part colours (see below) and tail pattern, which is obscurely barred dark grey and blackish-grey without white tip or white spots; also, no white on scapulars, and abdomen and thighs grey, shading to white. **Adult female** Browner-black above and paler vinous-rufous below, with more grey-mottled throat, abdomen and thigh. **Juvenile** Blackish-brown crown and nape with little rufous, but otherwise all rufous above, strongly spotted and barred with blackish-brown; tail paler rufous with four to five blackish bands; below, all tawny to buff or cream, with dark median throat-stripe, heavily streaked breast and sides, more spotted lower flanks and thighs. **Bare parts** Adult eyes yellow, juvenile yellow(?). Adult cere yellow-green, juvenile yellowish. Adult legs yellow, juvenile dull yellow.

**FLIGHT** Small raptor with accipiter proportions (p. 516), but short rounded wing-tips, relatively short square-ended tail; wingspan 1.8 times total length. No description of flight action. **Adult male** Black above, with greyer head and obscurely barred tail; predominantly greyish below, including grey-white throat, abdomen, thighs and sometimes crissum, and grey-mottled whitish

to buff underwings, but whole breast and much of belly vinous-rufous, remiges and tail blackish-banded. **Adult female** Dusky-spotted wing-linings. **Juvenile** Apart from streaky brown head, all rufous above, boldly spotted and barred with black, and paler rufous tail black-banded; below, body looks predominantly tawny-buff (creamier towards crissum) and underwings and tail more rufous, all strongly darker-marked, including heavily streaked breast and sides, spotted lower flanks and thighs, lightly speckled crissum, barred axillaries, greyer-stippled wing-linings, and clearly blackish-banded flight-feathers and tail.

**CONFUSION SPECIES** Adult (male in particular on size) very similar to adults of two other (not closely related) Sulawesi endemic forest accipiters, which all hard to see (though attracting attention by different calls): Spot-tailed Sparrowhawk [118] (rounded and proportionately longer tail with white tip and two to three white spots on each feather, whiter lower abdomen and thighs, short toes, red eyes, orange cere and, in flight, much whiter underwings) and Sulawesi Small Sparrowhawk [138] (tail-spots on 2-4 not showing when tail folded, orange eyes and legs and, in flight, less strongly mottled wing-linings, more strongly barred flight-feathers). Boldly marked juvenile relatively easy to distinguish from juveniles of same two species (both have plain rufous back and wings, different tail pattern, less streaked underparts and, in flight from below, far less strongly marked wing-linings, less boldly banded flight-feathers and tail, and plain crissum). See also description sections of all three, and Confusion Species under the other two: under Spot-tailed are comparisons with three more Sulawesi accipiters: Sulawesi Crested Goshawk [110] (notably juvenile male) and migrant Chinese and Japanese Sparrowhawks [115, 136].

**VOICE** Said to be very vocal. Rapid *hikihikihi...*, deeper and less piercing than similar call of Sulawesi Small Sparrowhawk [138].

**FOOD** Little known. Stomach contents of old specimens included lizards, insects, squirrels, mice, and smaller passerines. Structure of bill, legs and long thin toes, as well as high RSD, suggest that small birds likely to be the major prey. Hunting techniques not recorded.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Although sometimes found in relatively open wooded areas, no account of any displays, aerial or otherwise.

**BREEDING** No information.

**POPULATION** With a total range of over 200,000 km<sup>2</sup>, this is the most widespread of Sulawesi's three endemic lookalike accipiters, being found also on at least eight associated islands, but it remains little known – partly because of difficulties of field identification – and is generally assumed to be less numerous than Spot-tailed Sparrowhawk [118] but commoner than Sulawesi Small Sparrowhawk [138]. It is perhaps greatly under-recorded, and suggested four-figure population may be too low. It may also be less dependent than the other two on undisturbed dense forest, in which case it could do better than them in the long run with continuing clearance of Sulawesi's shrinking, if still extensive, forests.

**GEOGRAPHICAL VARIATION** Three races usually recognised, but differences slight between first two.

*A. r. rhodogaster* (Sulawesi) Cheeks grey.

*A. r. butonensis* (Muna, Buton) Cheeks paler grey, and paler vinous below.

*A. r. sulaensis* (Peleng to Sula group) Perhaps smaller, with less RSD; cheeks vinous-grey, faint vinous nuchal collar, tail less barred.

Sometimes regarded as belonging in the superspecies of Collared, New Britain and Moluccan Sparrowhawks [139–141] and the somewhat intermediate characters of the race *sulaensis* indicate that, long ago, Sulawesi was colonised from the Moluccas via the Sula archipelago (see Movements). Nevertheless, the Vinous-breasted Sparrowhawk – which has clearly ‘lived in isolation... for a considerable time’ (Wattell) – has many differences from the other three in both structure and plumage,

including adaptive convergence with two sympatric and unrelated lookalikes, the Spot-tailed and Sulawesi Small Sparrowhawks [118, 138]. Thus, it must be regarded as quite separate from the Collared Sparrowhawk group, even if its origin lay in part of the same complex.

**MEASUREMENTS** *A. r. rhodogaster* and *A. r. butonensis* combined: ♂ wing 158–175 mm, ♀ 194–214 mm; ♂ tail 115–128 mm, ♀ 142–156 mm; ♂ tarsus 51–54 mm, ♀ 57–63 mm. *A. r. sulaensis* ♂ wing 160 mm (one), ♀ 175–185 mm. **Weights** *A. r. butonensis* juvenile ♂ 113 g (one), juvenile ♀ 264 g (one).

**REFERENCES** Andrew (1992), Bishop *et al.* (1994), Moxburg & van Balen (1994), Meyer & Wigglesworth (1998), Rozendaal & Dekker (1989), Stresemann (1940a), van Balen (1994), van Bemmel & Voous (1951), van Marle & Voous (1946), Watling (1983), Wattell (1975), White & Bruce (1986).

## 143 OVAMBO SPARROWHAWK

*Accipiter ovampensis* Gurney, 1875

Plate 35

Other name: Ovampo Sparrowhawk

**DISTRIBUTION** Afrotropical (17°N to 28°S, but perhaps not breeding north of 1°N and not regularly north of 6°S); order 5+; not uncommon, even increasing and locally common, in southern half of range, but little known and rare or under-recorded elsewhere. Endemic to sub-Saharan Africa: rare and little known in West Africa (Senegambia and mainly northern parts of Sierra Leone, Ivory Coast, Ghana and Togo) and not much less mysterious from east Nigeria through north Cameroon and Central African Republic to Ethiopia (?breeds regularly), Uganda, Kenya and Tanzania (only two Kenyan breeding records for all of East Africa); more familiar in southern part of range from Angola, southern DR Congo, and Malawi through northern Namibia, north Botswana, Zambia and southern Mozambique, to Swaziland, and northeast South Africa.

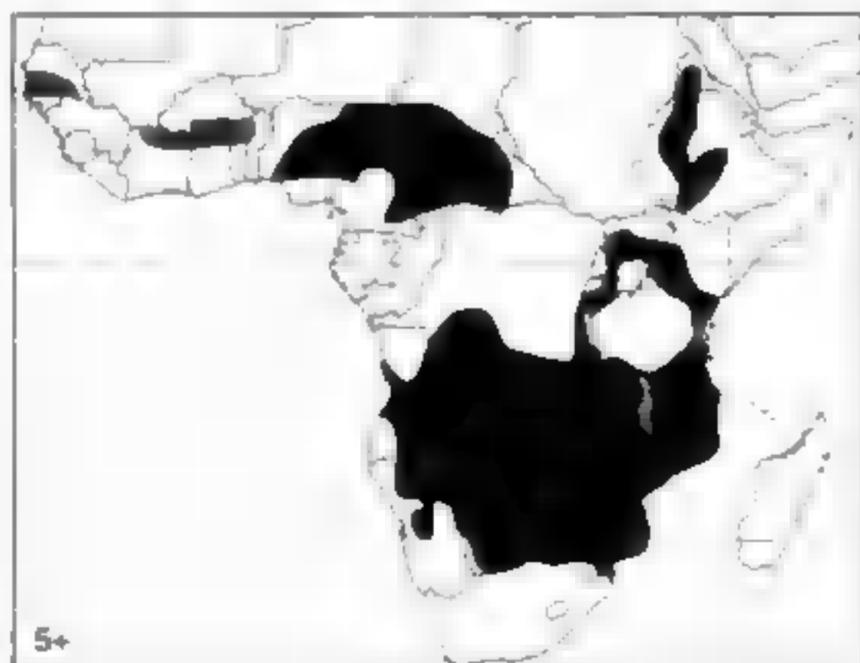
**MOVEMENTS** Probably both sedentary and nomadic or even migratory. Some southern birds are resident, at least in northeast South Africa, but it seems likely that others wander northwards or even make regular trans-equatorial migrations, though the reasons are far from

clear. Most in East Africa may well simply be wanderers, while those in the whole of the West African range are possibly no more than non-breeding migrants during the June–October rains.

**HABITAT** Fairly dry woodland (acacia, mopane, brachystegia) and wooded savannah, thornbush and, particularly in South Africa, plantations of various sorts, such as eucalyptus, poplar, pine and sisal, but always with open areas adjoining. Sea-level to 1,800 m.

**FIELD CHARACTERS** Smallish to mid-sized accipiter, as adult grey and barred or, rarely, all black, with distinctive shape and proportions: small bill and large fleshy cere that together dominate curiously small pointed head; short thin legs with long toes. Often within cover, but sometimes perches very openly; relatively long wing-tips nearly half down shortish tail. Dimorphic (dark morph rare). Sexes similar, but female averages 12% larger and 85% heavier; juvenile distinct; apparently molts direct into adult plumage.

**PERCHED** **Pale morph adult male** Uniform blue-grey above with dark-banded tail; white spots on rump at best inconspicuous, especially in worn plumage, but central tail shows fairly clear white strips where shaft passes through three grey bands; below, except for plain white crissum, all finely barred grey and white, including throat. **Pale morph adult female** Browner-grey above and more heavily barred below. **Dark morph adult** Both sexes entirely blackish-brown, except that tail exactly as grey morph, including white central shaft-strips. **Juvenile** Brown above, edged rufous, with distinctive pale supercilia above dark eye, ear-patches; tail banded, but much thinner light shaft-strips of little use in field; usually all creamy below with rather variable dark shaft-streaks and more barred flanks (and then also whiter-looking on crown and nape), but some almost plain rufous below, but for scattered dark shaft-streaks, or sometimes with whiter throat and faint barring on flanks or abdomen (both forms produce pale morph adults, and juvenile of dark morph undescribed). **Bare parts** Adult eyes dark



red to red-brown, juvenile brown. Adult cere and legs orange-yellow, juvenile yellow.

**FLIGHT** Small raptor, with accipiter proportions (p.516), but relatively long round-tipped wings and short squared tail combining into distinctive shape; wingspan almost 2.0 total length. Though, like all accipiters, direct flight is mixture of fast beats and short glides, this bird seems unusually active, graceful and highly manoeuvrable; also soars high. **Pale morph adult** Grey above and finely barred below (including throat and wing-linings), except for banded tail (on which central white shaft-strips may show above) and boldly banded flight-feathers below. **Dark morph adult** All blackish, except that tail and wings as grey morph, banded remiges contrasting sharply with black wing-linings. **Juvenile** Flight-feathers and tail more thinly banded; pale juvenile otherwise nondescriptly cream to buff below with fine markings, including wing-linings, so that whitish supercilia and generally pale head with contrasting dark eye/ear-patches again best character; plain pale rufous underbody and wing-linings of rufous juvenile more distinctive, except where range overlaps with Rufous-breasted Sparrowhawk [146].

**CONFUSION SPECIES** Confusion of pale morph adults most likely with adults of two species of comparable proportions apart from shorter wings and larger heads these being Gabar Goshawk [107] (grey throat and chest, red cere and legs, white rump, very different tail pattern) and Shikra [113] (yellow cere and legs, fine rufous barring below, plain grey central tail). Some features also coincide with those of Little Sparrowhawk [135] (but latter smaller, darker, with quite different white marks on otherwise plain black tail, yellow bare parts, white throat and rump-band, rufous-washed flanks). Much greater similarity between dark morphs of Ovambo and Gabar, both being black over same areas with contrasting barred pale flight-feathers, but Gabar has thinner dark bars there and thinner white bars on more rounded tail, also pale windows on upper-sides of primaries, and red cere and feet. Also to be borne in mind are melanistic individuals of the south-central race *sparsifasciatus* of African Goshawk [111] (usually bigger, different proportions, less clearly banded tail above and below, bare parts yellow) and Great Sparrowhawk [151] (much bigger, with white throat, yellow cere and legs, obscurely banded tail). If eye colour can be seen in these African accipiters, exact shade is worth noting as that can often be aid to identification (compare 'Bare parts' for individual species). Rufous juvenile Ovambo closely resembles adult Rufous-breasted Sparrowhawk [146] (larger rounded head, defined dark cap with only thin supercilia and no dark eye-patch, yellow eyes, no rufous edges on upperparts). (See also fig. 37 on p. 515).

**VOICE** Silent except in breeding season, when becomes very vocal near nest. Main contact and territorial call is sharp repeated *keep keep keep keep...* High-pitched *ki-ki-ki-ki...* to drive off intruders and harsh *krr-krr-krr...* in threat. Female utters rapid *kwee-kwee-kwee...* when male brings food.

**FOOD** Mainly birds; probably also some flying insects (which once assumed to be chief prey of what was then

little-known raptor). Birds especially smaller passerines and doves (taken by male and female respectively), but records include bee-eaters, hoopoes and woodpeckers; male prey in range 10–60 g, female up to 250 g. Still-hunts from both concealed and very open perches, dashing out to catch birds in flight; but, more typically, forages on the wing over woodland or adjacent grassland and other open country and chases individual birds or flocks it flushes or, while soaring, stoops at prey from up to 150 m.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. In courtship, male and female soar and circle together while calling. Undulating flight by male also recorded. In southern Africa, may share exotic plantations with Shikra [113], Little Sparrowhawk [135] or Rufous-breasted Sparrowhawk [146], but not Great Sparrowhawk [151].

**BREEDING** August/September–December in southern Africa; seasons little known elsewhere, but breeding records May and September in Kenya. Smallish structure of thin sticks, 35–50 cm across and 15–20 cm deep, lined with finer twigs, occasionally bark chips or dry or green leaves; at 10–20 m, usually in main fork below canopy, in any tall tree, but often poplar, eucalyptus or pine in southern Africa. Clutch 3 (1–5). Incubation 33–36 days. Fledging c33 days.

**POPULATION** Mostly regarded as rare (under 40 records in Kenya up to 1980) and something of a mystery, except in southern Africa, where, having adapted to exotic plantations in farmland and increased in consequence, now locally commoner than other accipiters. In one area of northeastern South Africa 19 pairs recorded in 600 km<sup>2</sup>, though in another only 1–2 in 350 km<sup>2</sup>. As the known breeding range encloses over 3.5 million km<sup>2</sup>, even the latter figure would suggest a total population well into tens of thousands. If species continues to favour man-made woodlands, may perhaps spread elsewhere in the modern environment.

**GEOGRAPHICAL VARIATION** Monotypic. Dimorphic, but dark morph adult apparently rare everywhere, while rufous juvenile (which has no connection with dark morph adult) appears to be very local.

**MEASUREMENTS** ♂ wing 210–233 mm, ♀ 244–262 mm; ♂ tail 145–164 mm, ♀ 172–185 mm; ♂ tarsus 43–49 mm, ♀ 50–60 mm. **Weights** ♂ 105–190 g, ♀ 180–305 g.

**REFERENCES** Allan & Hustler (1984), Benson & Benson (1975), Biggs *et al.* (1979), Black & Ross (1970), Britton (1980), Brown (1970b), Brown *et al.* (1982), Craib (1983), Ginn *et al.* (1989), Grimes (1987), Irwin *et al.* (1982), Kemp & Crowe (1994a), Kemp & Kemp (1975a, 1998), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957–75), Maclean (1993), Pickford *et al.* (1989), Pinto (1983), Simmans (1986a), Steyn (1982), Tarboton & Allan (1984), Tarboton *et al.* (1989), Thiollay (1978c, 1985d), Wattel (1973).

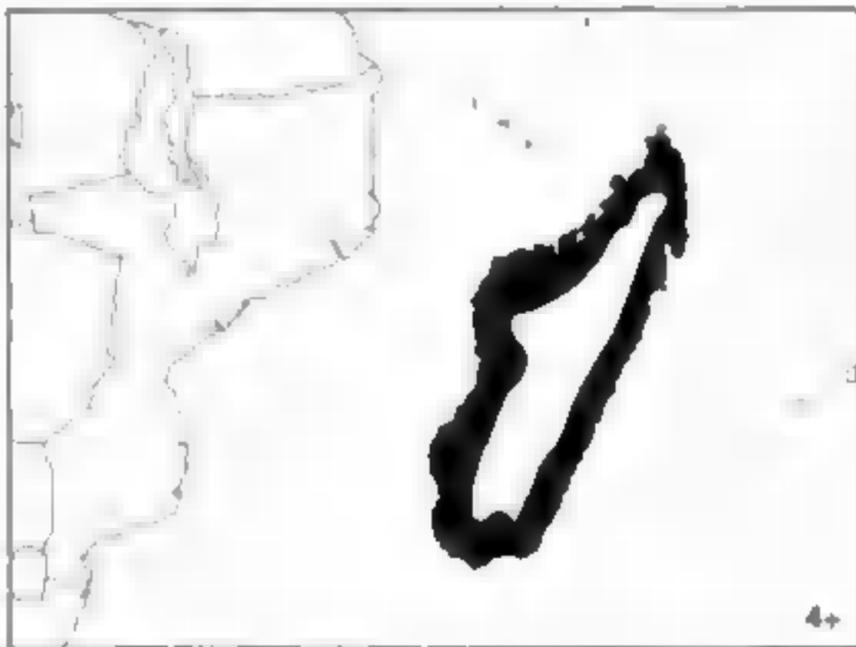
## 144 MADAGASCAR SPARROWHAWK

*Accipiter madagascariensis* A Smith, 1834

Plate 38

**DISTRIBUTION** Malagasy (12°S to 26°S); order 4+; often considered rare, and sightings infrequent, though probably under-recorded and perhaps locally not uncommon. Endemic to Madagascar, where thinly distributed except along central ridge and plateau.

**MOVEMENTS** Apparently sedentary, but immatures may well be more nomadic.



**HABITAT** Primary rainforest to wooded savannah, perhaps especially deciduous woodland and thorn-scrub of west and south; some adaptation to partially exploited forest, but rare in degraded areas. Sea-level to 1,500 m, mainly below 1,000 m.

**FIELD CHARACTERS** Small to medium-sized accipiter, slate to dark brown above and barred below as adult, with small bill, short rounded wings, mid-length squared tail, long slender legs and toes. Secretive. Perches inside deep cover, wing-tips barely exceed tail-coverts. Sexes rather similar, but female 11–39% larger (both sexes resemble female Northern Sparrowhawk [145], though shorter-winged and male much smaller); juvenile distinct.

**PERCHED** **Adult male** Dark brownish-slate above with grevish cheeks, many obscure tail-bars; white below, thinly streaked on throat and otherwise finely barred blackish-grey. **Adult female** Browner above, with darker head and cheeks, and more heavily barred below. **Juvenile** Paler brown above, with white streaks on nape and clear rufous edgings; cream below, variably streaked with pale to dark brown (thinly on throat, broadly on breast, more splodged or diamond-shaped on abdomen). **Bare parts** Eyes yellow. Cere and feet greenish-yellow, juvenile duller.

**FLIGHT** Small raptor with accipiter proportions (p. 516), but relatively short rounded wing-tips, longish squared tail; wingspan 1.6 times total length. Generally flies unobtrusively, fast and low among trees; rapid beats punctuated with short glides on flat wings. **Adult** Dark brownish-slate to brown above; and all finely dark-barréd below, including wing-linings, but for contrasting white vent and crissum; grevish undersides of flight-feathers and tail quite clearly barred. **Juvenile** Paler brown above, all edged rufous, with white-streaked head and fewer,

broader tail-bands; and streaked and blotched below, with barred flanks and spotted undertail-coverts.

**CONFUSION SPECIES** Both adults and juvenile similar in pattern to Henst's Goshawk [152], but that species significantly larger (smallest males 20% bigger than largest female Madagascar) and much more thickset, while both sexes have more the colouring of male Madagascar. Male may be confused, on size and general pattern, with adult and juvenile female Frances's Sparrowhawk [117], but that has more pointed wings, longer and more rounded tail, browner upperparts with either contrasting grey head (female) or streaky supercilia (juvenile), and rufous rather than dark brown barring below, looking paler in flight underneath without contrasting white tail-coverts.

**VOICE** Described as similar to that of Frances's Sparrowhawk [117].

**FOOD** In view of extreme RSD and long slender legs and toes, likely to be primarily bird-eater, and the few prey records do refer mostly to birds, but recorded also taking amphibians and reptiles, and seen to catch cricket on wing. Apparently sometimes pounces on prey in flight, but chiefly still-hunts from concealed perches on lower branches.

**SOCIOSEXUAL BEHAVIOUR** Solitary, or in pairs. Soars above trees, but display-flights not described.

**BREEDING** Recorded November. Nest of sticks, lined with finer twigs, high in forest tree; one on side branch 6 m from trunk was about 50 cm across and 25 cm deep. Clutch 3. No data on incubation and fledging periods.

**POPULATION** Range as mapped covers over 350,000 km<sup>2</sup>, which could accommodate high five-figure population, but habitat restrictions, thin distribution and general rarity make estimate in upper thousands much safer. Being secretive and doubtless under-recorded, it may well be commoner than it appears to be. Being a species of primary forest and undisturbed woodland and thorn-scrub, it must be threatened by continuing deforestation and other human activities.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 168–198 mm, ♀ 219–254 mm; ♂ tail 133–154 mm, ♀ 174–187 mm; ♂ tarsus 48–55 mm, ♀ 61–67 mm. **Weights** No data.

**REFERENCES** *BirdLife International* (2000), *Dee* (1986), *De Puy & Moat* (1996), *Langrand* (1990), *Langrand & Meyburg* (1984), *Milon et al.* (1973), *Morris & Hawkins* (1998), *Wattel* (1973).

**145 NORTHERN SPARROWHAWK**  
*Accipiter nisus* (Linnaeus, 1758)

**Plate 39**

Other names: Eurasian or, more locally Asian, or Indian Sparrowhawk

**DISTRIBUTION** Palearctic and marginally Indomalayan (70°N to 27°N), also more extensively Indomalayan and even eastern Afrotropical in winter (64°N to 12°S); order 7; generally common again now in Europe, though decreasing in parts of east and south, but apparently scarcer over much of Asia. Breeds almost all countries of Europe (not Iceland) east nearly right across Siberia to Indigirka and southern Kamchatka, south to Canaries, Madeira, northwest Africa, Corsica and Sardinia, Sicily, Greece, Turkey, Caucasus, northern Iran, Ukraine, northern Kazakhstan, Tien Shan, northern Mongolia, Manchuria and northeast China, Korea and Japan; also from northern Pakistan (perhaps north Baluchistan and east Afghanistan) eastwards along Himalayas through Kashmir, Nepal, Sikkim and Bhutan to Assam, Tibet and southwest China.

**MOVEMENTS** Various migratory, partially migratory, or sedentary and dispersive. Populations of western and southern Europe, northwest Africa and Atlantic islands almost entirely resident, and those of much of rest of Europe south of southern Fennoscandia partially so, but most Fennoscandian birds and those of north Russia across Siberia move south end July–mid November to mid February–early June (peaks October and April, around times of heavy passerine migration). At Falsterbo, southern tip of Sweden, daily totals of around 1,000 may be seen between late August and early October, and nearly 20,000 passed through there in autumn 1994, but passage at either end of Mediterranean and across Sicily-Tunisia narrows relatively light (up to 1,000 per autumn at Gibraltar and only 500 at Bosphorus, and those

mostly juveniles). Winter visitors from north Eurasia reach northwest and northeast Africa, and commonly southern Europe, southern Asia (southern Iran, southern India, Bangladesh, south China and central Vietnam, but rare Thailand) and quite commonly even southern Arabia (south to Yemen and Oman) and down into northeast Africa (eastern Sudan and northern Ethiopia). Vagrants reach other parts of northern Africa and, south of Sahara, west to east Niger and Chad and south to Kenya and northeast Tanzania (an alleged 19th century specimen in South Africa was considered by Stejneger to be immature Rufous-breasted Sparrowhawk [146]). In general, juveniles move earlier and farther than adults, and males farther than females (northern European males recovered at up to 2,660 km, but Asiatic birds must often travel 6,000 km or more).

**HABITAT** Wide variety of basically wooded areas, with smaller or younger trees forming at least some dense cover, and adjacent open hunting ground. Thus, breeding habitat ranges from extensive forest with edges or clearings, broken woodland, small plantations, wooded mountain valleys, high timbered slopes, and even hill scrub, to cultivation with scattered copses or shelterbelts and tall hedgerows, overgrown orchards and parkland, and locally parks and cemeteries in towns and cities; often by streams and rivers. Though sometimes in pure broadleaf woodland, prefers conifer or mixed (in east Asia, also confined to spruce by competition with Japanese Sparrowhawk [136]), which inhabits the broadleaf). In winter, more widely distributed in farmland, suburban areas and open country with relatively few trees. Sea-level to 4,500 m, but more southerly populations (*punicus* of northwest Africa and *melanchrinus* of Himalayas; see



contrasting dark wing-tips; shorter tail with more and narrower bars; grey cheeks on male, more uniform head-sides on female, dark eyes, conspicuous yellow cere; more level flight with faster and shallower beats; juvenile with clear streaks on breast switching to heavy bars on axillaries). See further comments under Levant Sparrowhawk, especially first-summer which has barred underbody and no dark wing-tips (so wing shape, flight action, and colours of sides of head and eyes then particularly important). (See also fig. 40 on p. 597). In south and east Asia, at differing seasons, care also needed with Chinese and Japanese Sparrowhawks [115, 136] and Shikra [113] and Besra [137] (see discussion under Japanese Sparrowhawk: Confusion Species). Always bear in mind possibility of confusion with small falcons when soaring or briefly glimpsed, especially Common Kestrel [277] and Merlin [294] (can look broader-winged when soaring but tips always more pointed, trailing edges straighter, action very different).

**VOICE** Generally silent away from nest area. Main call shrill cackling *kek-kek-kek-kek...* or *kekkekkek...* varying in speed and volume according to circumstances: slower in advertisement and contact between pair, faster in threat against territorial intruder or human or other predator, while softer *keo-keo-keo-keo...* used when bringing prey and soliciting. Other major call is plaintive disyllabic wail, *pee-oo*, uttered by female expecting male with food; fledged juvenile wanting to be fed draws periodic attention to itself by thinner and more piercing *peey* with pitiful quality of dejection!

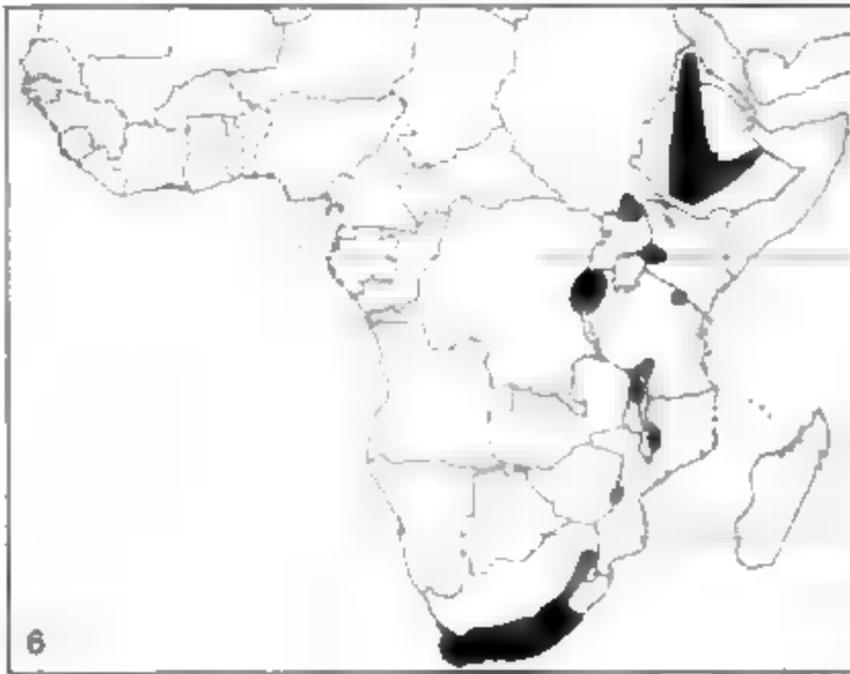
**FOOD** In general, almost entirely small or smallish birds, but, when voles *Clethrionomys/Microtus* abundant in north Europe, these sometimes taken to considerable extent; other mammals, such as young rabbits and hares, shrews, rats, squirrels and bats, only very occasionally; lizards, amphibians, carrion and insects even more rarely, though swarming cockchafer *Melolontha* and orthopterans may attract an individual to feed on them almost exclusively. Recorded bird foods include nestlings and nidilugous young, but more commonly recent fledglings, inexperienced juveniles, and adults, ranging in size from Goldencrest *Regulus regulus* to pigeons *Columba*, Eurasian Jay *Garrulus glandarius*, Northern Lapwing *Vanellus vanellus*, Common Kestrel [277], other Northern Sparrowhawks, and gamebirds, such as Grey Partridge *Perdix perdix*, Red Willow Grouse *Lagopus lagopus* and females of Ring-necked Pheasant *Phasianus colchicus* and Black Grouse *Tetrao tetrix*. All these larger birds rarely attacked, however, and only by female sparrowhawks. Males take chiefly small birds up to c40 g (occasionally to 120 g); females small and slightly larger birds up to 150 g (occasionally to 500 g or more). Commonest are often gregarious ground-feeders, especially sparrows *Passer*, Chaffinches *Fringilla coelebs* and other finches, thrushes *Turdus*, Sky Larks *Alauda arvensis* and other larks, Yellowhammers *Emberiza citrinella* and other buntings, Common Starlings *Sturnus vulgaris* and pipits *Anthus*, but also European Robin *Erithacus rubecula*, Willow Warblers *Phylloscopus trochilus* and other warblers, and various tits *Parus*. Catches most prey in surprise-attack, either by perch-hunting from series of concealed or occasionally exposed sites 50–100 m apart (spending few minutes at each) or by dashing low along hedgerows, fences, wood edges, streams and other interfaces,

abruptly changing direction or turning on side or back to grab grounded, perched, rising or flying bird with one foot or both according to size. Commonly also tail-chases small birds (even following into cover, sometimes on foot); occasionally soars and stoops on prey; or flaps low and steadily (looking less hawk-like?) towards finch flock out in open field. Smaller male also ready to fly through dense woodland, larger female more in open. Will make frequent visits to profitable prey sources, such as birdtables, farmyards, woodland pools and other regular feeding or bathing sites, as well as roosts. Rarely hawks aerial insects.

**SOCIOSEXUAL BEHAVIOUR** Generally solitary or in nesting pairs; usually also migrates singly and, although concentrating at narrow sea-crossings – so that c1,000 may be recorded daily at Falsterbo, Sweden, end August to early October – these are not travelling together and, at most, may form loose temporary associations of a few or with other species. Aerial activities make this generally secretive bird sometimes much easier to see. High-circling may occur in any month and is often a prelude to hunting, most commonly by female, but forms part of aerial displays by one or both of pair particularly from late February to early May, with peaks during nest-building and egg-laying: soars up in tight circles, climbing aided by bouts of rapid wingbeats, tail closed, and undertail-coverts spread and then retracted (tail-flapping). Other display elements by either sex include slow-flapping at constant height with deliberate deep beats, wings looking rather pointed, tail closed and undertail-coverts again flapped; and undulating combination of shallow or steep dives and upward swings on flapping and then closed wings. Full sky-dance, apparently performed only by male in presence of female (cf. Northern Goshawk [153]), involves all these elements. Male may also plunge at female flying or perched, or may chase female in and out of trees; one pair recorded grasping talons and somersaulting down on more or less spread wings.

**BREEDING** Mid April–end August. Untidy loose structure of twigs (especially larch and birch), 30–80 cm across and 8–30 cm deep, lined with bark chips, decayed wood, fine twigs, rarely greenery; at 6–15 m (1.5–35 m) in fork, often by trunk, or on horizontal branch of most commonly conifer, but often oak, birch or other broad-leaf tree, sometimes in bush or osier; often close to clearing, path or road, but sometimes well inside dense plantation. Clutch 4–6 (3–7). Incubation 33–35 (32–36) days. Fledging 24–30 days; independence 20–30 days later.

**POPULATION** This is one of Eurasia's six most widespread and commonest raptors: despite long-standing human persecution, especially from game interests, and then marked decreases in 1950s and 1960s as result of pesticide pollution, numbers have recovered since 1970s with more enlightened attitudes, protection, and pesticide controls, and are stable or increasing in parts of north, central and southeast Europe. In broadest terms, limits of breeding range enclose over 9 million km<sup>2</sup> of Europe and something approaching 25 million km<sup>2</sup> in total. Densities of 10–72 pairs/100 km<sup>2</sup> have been found in Britain (where this has long been one of the most intensively studied of all raptors, especially by Newton and colleagues since 1970s and Owen 60 years earlier)



suspected in southern Africa, and immatures probably nomadic elsewhere: spreads relatively quickly to new plantations in southern Africa.

**HABITAT** In East Africa, considered typical of subtropical highland forest, mainly at 2,000–3,000 m and up to 3,700 m in Ethiopia (though locally down to 1,600 m in Kenya and 1,200 m in Uganda and eastern DR Congo); but also readily hunts over cultivation and other open country, including parkland and extensive gardens. In South Africa, down to sea-level and, although nesting and roosting in often quite small woodlands, forages frequently over open grassland and dry scrub: indeed, range has been extended in such areas by advent of nesting and roosting sites in form of clumps of poplars, pines and eucalyptus planted as windbreaks around rural homesteads.

**FIELD CHARACTERS** Smallish to mid-sized accipiter, as adult dark slate and rufous, with proportions like Northern Sparrowhawk [145] of Palearctic, including small bill, rounded head, long thin legs and toes. Though often perches within cover, sometimes very much in open; relatively long wing-tips about quarter way down longish tail. Sexes similar, female averaging 16% larger; juvenile variable but always distinct; presumably moults direct into adult plumage, like Northern Sparrowhawk. **PERCHED Adult** Distinctive: mainly dark slate above, this colour extending with hooded effect as curve behind and under cheeks, and otherwise largely pale rufous; little white may show through on nape or scapulars, and sometimes throat and belly white; white-tipped and broadly dark-banded tail with thin white shafts to grey parts of central feathers (cf. Ovambo Sparrowhawk [143]). (Female browner above, richer rufous below.) **Juvenile** Dark brown above, edged rufous, again with slightly hooded look, thin supercilia, tail much as adult; always pale rufous thighs and, especially on throat and breast, scattered dark shaft-streaks, but otherwise varies below from whitish or buff with rufous streaks and brown flank-bars, to mainly pale rufous except for more or less barred abdomen and sometimes white throat. **Bare parts** Adult eyes, cere and feet yellow; juvenile similar, except cere pale greyish at first, turning yellow at about four months. **FLIGHT** Small raptor, close to Northern Sparrowhawk [145] in shape, with round-tipped wings which are relatively longer than those of many other African accipiters, and longish squared tail: wingspan 2.0 times total length. Fast beats with short glides on flat wings, though

beats continuous in open hunting; soars high on level wings, variably spread tail. **Adult** Looks all dark above, with banded tail, and largely rufous below, including wing-linings, but for boldly banded flight-feathers and tail. **Juvenile** Browner and also fairly uniformly dark above, and sometimes almost as plain rufous below, though most are more streaked and mottled on body and wing-linings; flight-feathers and tail much as adult, though background tone less white and contrasting.

**CONFUSION SPECIES** Adult and more rufous juvenile unlikely to be confused with anything but rufous juvenile Ovambo Sparrowhawk [143], but here risk quite high: juvenile Ovambo best distinguished by smaller pointed head, broad pale supercilia and dark eye-patches, brown eyes, and extensively rufous-edged upperparts. Because of its mixture of streaks and bars below, paler juvenile has slight resemblance to immature Gabar Goshawk [107], but that more heavily marked and, among many other differences, has white rump-band, thinly barred flight-feathers, orange cere and legs, somewhat different shape and prefers different habitat.

**VOICE** Silent except in breeding season, when very noisy. Staccato *kew-kew-kew...*, male higher-pitched than female, used in courtship flights and as contact and territorial call. Harsh *chek-hek-hek...* of alarm. Plaintive mewling *kiss-u* by female soliciting food.

**FOOD** Largely birds up to c 100 g, also some small mammals (bats, rodents), few insects (such as alate termites). Birds vary in size from small passerines to pigeons: include larks, pipits *Anthus*, sparrows *Passer*, finches, starlings, doves and, more unexpectedly, Alpine Swifts *Apus melba*. Apart from standard accipiter techniques – still-hunting from concealed or open perches, and surprise-flights behind and then through or over cover – readily forages over open country. Indeed, in southern Africa, hunts mainly over wide variety of such areas from open grassland to low scrub, speeding along just above ground and snatching or tail-chasing prey, or sometimes stooping from soaring flight.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. In courtship, male or pair soar and circle high over nesting area, calling frequently often with undertail-coverts fluffed out on either side. No acrobatics recorded.

**BREEDING** July/August–February from southern Africa north probably to Kenya, but mostly October–January. Thick platform of thin sticks, 40–45 cm across and 20–30 cm deep, usually lined only with finer twigs, sometimes green leaves, moss and bark; in southern Africa, at 6–18 m in main fork below canopy, especially in poplar, eucalyptus or pine. Clutch 3 (2–4). Incubation c34 days. Fledging 31–36 days, with dependence c3–6 weeks.

**POPULATION** Few data on densities: seven nests in east Zimbabwe averaged 6.4 km (3–12 km) apart; 1 pair/23–33 km<sup>2</sup> in one region of northeastern South Africa. But, despite curiously relict distribution, has total range of perhaps 1.5 million km<sup>2</sup>, within which often widespread and in southern Africa undoubtedly spreading; on this basis, population seems likely to be in at least lower hundreds of thousands. In East Africa north to Ethiopia, where largely restricted to upland forest, stated to be threatened locally by habitat destruction, but ready adaptation in southern Africa to small exotic plantations

indicates that numbers may actually be increased by diversification.

**GEOGRAPHICAL VARIATION** Two races usually recognised.

*A. r. rufiventris* (DR Congo and Kenya to South Africa) As described above.

*A. r. perspicillaris* (highland Ethiopia) Deeper rufous below and, on average, very slightly smaller, shorter-winged and longer-tailed.

Nominate juveniles individually variable and differences shown on plate represent extremes. Species sometimes regarded as conspecific with Northern Sparrowhawk [145] but, having quite distinct underparts and being separated by 2,000 km, more usually treated as forming a superspecies with it.

**MEASUREMENTS** *A. r. rufiventris* ♂ wing 194–210 mm, ♀ 224–245 mm; ♂ tail 149–162 mm, ♀ 172–195 mm; ♂ tarsus 49–53 mm, ♀ 56–61 mm. *A. r. perspicillaris* ♂ wing 192–200 mm, ♀ 225–232 mm. **Weights** *A. r. rufiventris* unsexed 185–210 g (two).

**REFERENCES** Benson & Benson (1975), Black & Row (1970), Boddam-Whetham (1968), Britton (1980), Brown *et al.* (1982), Butynski & Kalina (1988), Dowssett & Dowssett-Lemaire (1980), Ginn *et al.* (1989), Grobler (1981), Irwin *et al.* (1982), Kemp & Kemp (1998), Macdonald (1986), Mackworth-Pratt & Grant (1957–73), Maclean (1993), Pickford *et al.* (1989), Pinto (1989), Simmons (1984, 1986a, b/c), Snow (1978), Steyn (1982, 1988), Tarboton & Allan (1984), Tarboton *et al.* (1989), van Zyl & Cooke (1987), Vincent (1962), Watel (1973), Zimmerman *et al.* (1996).

## 147 SHARP-SHINNED HAWK *Accipiter striatus* Vieillot, 1807

Plate 49

Other names: Sharpshin; White-bellied (Central America), Plain-breasted (northwestern South America), Rufous-thighed (eastern South America) Hawk.  
Proposed names: Sharp-shinned, White-bellied [etc.] Sparrowhawk

**DISTRIBUTION** Nearctic and Neotropical (60°N to 41°S, dispersive to 35°S); order 7; in North America generally common, but elsewhere varies from only fairly common to uncommon and local. Boreal, temperate and tropical Americas, including largest Caribbean islands (but Central and South American populations sometimes considered two to three distinct species; see Geographical Variation). Nearctic range extends from central Alaska and much of Canada to upland Mexico (Sonora and southeast Coahuila to Guerrero and central Oaxaca); on western side of USA mainly through Rockies and adjacent uplands from Washington and west Montana south to California, eastern Arizona and western New Mexico; but on eastern side, after central distributional gap in Great Plains, down only to Missouri and through Appalachians to northwest Georgia. Elsewhere, discrete populations on larger Caribbean islands of Cuba (now uncommon to rare), Hispaniola, and Puerto Rico (rare); from southeast Mexico (east Oaxaca and Chiapas) through Guatemala and northernmost El Salvador to Honduras and northwest Nicaragua; from Colombia and mainly upland Venezuela south through Andes of Ecuador and east Peru to west Bolivia; and, east of Andes, from east Bolivia across to eastern Brazil, Paraguay, Uruguay and north Argentina (south to provinces of San Luis and Buenos Aires).

**MOVEMENTS** Various migratory, partially migratory, altitudinally or locally dispersive, or sedentary. Populations of much of Alaska and Canada (except those of Pacific coastal slopes and, in east, Nova Scotia and southernmost Ontario) move south in late August–October, then occurring over much of USA and Central America as far as Panama (where North American birds uncommon but regular winter visitors), and return north from March, some not arriving back in boreal breeding grounds until June. Sexes and age-classes tend

to migrate separately. Some migrants reach Bahamas and Florida Keys, and vagrants recorded on cays northwest of Yucatan Peninsula and, in eastern Pacific, even Isla San Benedicto (northeast of Socorro). Central and South American populations probably mostly sedentary, apart from altitudinal movements in some areas, but in Argentina some dispersal southwards in Buenos Aires province and south to northern Rio Negro.



**HABITAT** Breeds in variety of timbered areas, typically in cool northern regions and in mountain uplands farther south, but Central and South American forms also extend into both arid and humid tropical lowlands. In arctic Canada, north to limit of boreal coniferous and conifer-birch forest; in temperate North America, mainly in mountain coniferous and mixed woodland, much less commonly in broadleaf lowlands; in Central

and rounded tail; also, except in range of *ventralis*, adults show much grey or at least greyish-white below and juveniles unstreaked. Consider also: Tiny Hawk [132] (large females as big as small male Sharp-shinned, but more pointed wings, shorter tail, adult closely grey-banded below and without rufous thighs, and dimorphic juvenile either rufous or brown above and banded, not streaked, below); brown-morph juvenile Semicollared Hawk [133] (like larger edition of juvenile Tiny, but more broadly banded below and with pale rufous or whitish collar); Double-toothed Kite [31] (adult with superficially similar pattern, though more like Bicoloured, but shape, proportions and actions quite different); and, as geographically appropriate, forest-falcons [261–266] (some banded below, some plain, but linked more by skulking behaviour than by shape or plumage). (See also fig. 40 on p. 597.)

**VOICE** In breeding season, thin yelping *keu-keu-keu*... or high-pitched squealing, but otherwise generally silent.

**FOOD** Almost entirely birds, ranging in size from hummingbirds to small pigeons, in breeding season also including nestlings; occasionally small mammals, lizards, frogs, insects. In North America, birds form 75–90% of prey: such groups as New World warblers (Parulidae), vireos and sparrows (Emberizidae) often commonest victims, but high RSD of female enables her to take slightly larger thrushes (Turdidae) and icterids. Mean weight of prey taken by males calculated at 17.6 g and of females 28.4 g. Foraging involves still-hunting from concealed perch, or regular visits to sites such as bird-feeders and roosts, or transect-flights along such interfaces as forest edges and hedgerows, and through or over woodland, always relying on surprise: short tail-chase often follows, with hawk trying to grab prey or prevent it from reaching cover; sometimes even pursues quarry on ground.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, but in loose flocks on passage through North and Central America. Single or mutual high-circling frequent, chiefly in mornings and especially in breeding season.

**BREEDING** As late as end May–August in Alaska and Canada and March–April–July in southern USA and Mexico, but January onwards in Caribbean; few indications of season in South America. Nest fairly small but, for size of species, relatively bulky structure of twigs, c50 cm across and c20 cm deep, lined with pieces of bark and green leaves, sometimes based on old nest of crow or squirrel, at 4–20 m in fork or on branch close to trunk of conifer or other tree in dense grove or at forest edge. Clutch 4–5 in North America, 3–5 in Mexico, 2–3 in Caribbean. Incubation variously put at 30–35 days. Fledging 21–27 days (on to branches nearby), but not fully feathered until 36–40 days.

**POPULATION** Generally regarded as common in western mountain and northern forests of North America, fairly widespread but at low densities elsewhere from there into Mexico; 'frequent to uncommon' in Central America (*chionogaster*, see Geographical Variation); generally rare and local on Caribbean islands (three races); and mostly 'fairly common' or 'relatively common' in South America (*ventralis* and *erythronemius*). With total

breeding range extending over vast area of, roughly, 12–13 million km<sup>2</sup>, it thus seems reasonable to assume seven-figure population, even though information on densities surprisingly lacking. North American populations were affected by organochlorine pesticide residues until 1970s, but migration counts suggest an increase again from 1980s. Deforestation has affected distributions and numbers in various parts of range. Deforestation and shooting have greatly reduced the Caribbean races: population of Puerto Rico was put at 'perhaps 200–300' in mid 1980s and, more recently, that on Cuba (which approaches size of England) at only 155.

**GEOGRAPHICAL VARIATION** Complicated. Ten geographical forms have usually, since Storer's discussion of the resident Mexican races in 1952, been regarded as representatives of one species.

#### Caribbean group

*A. s. striatus* (Hispaniola) One of three smallest forms; rufous cheeks; banded rufous below with more or less uniform rufous thighs; obscurely banded tail.

*A. s. fringilloides* (Cuba) Similarly small; brighter rufous cheeks; more banded below and thighs browner.

*A. s. venator* (Puerto Rico) Also similarly small; rufous thighs; more clearly banded tail.

#### North American group

*A. s. velox* (much of North America, wintering south to Panama and Bahamas) Middle-sized; rufous cheeks; all finely banded rufous below; banded tail.

*A. s. perobscurus* (Queen Charlotte Islands, perhaps adjacent coast of British Columbia, wintering south to Oregon) Middle-sized; darker above; more heavily banded rufous below.

#### Mexican group

*A. s. suttoni* (north Mexico, and perhaps southernmost New Mexico, south to Michoacán and Veracruz) One of two largest races; paler than *velox*, with plain light rufous thighs.

*A. s. madrensis* (Guerrero and west-central Oaxaca) Other largest race; much paler rufous barring below.

#### Central and South American group

*A. s. chionogaster* (southeast Mexico to Nicaragua) Middle-sized; blacker above, with grever cheeks; largely white below, but for pale buff thighs.

*A. s. ventralis* (Colombia and Venezuela along Andes to west Bolivia) Middle-sized; only polymorphic form, with morphs ranging from pale through rufous to dark; pale morph (formerly separated as '*salvini*') not unlike *chionogaster*, but browner above, more rufous thighs, and often faint grey or rufous bars; dark morph ('*nigroplumbeus*') black-brown above, with obscure tail-bands, and slate-grey below, apart from paler throat and chestnut-tinged cheeks and abdomen; in between, wide variety of intermediates, but most typically brown-slate above with thin pale tail-bands, and whitish below, dark-streaked on throat and otherwise variably tinged and banded rufous-buff, most strongly and most solidly on flanks and thighs.

*A. s. erythronemius* (southeast Bolivia and south-central Brazil to north Argentina) Smallish; blue-grey above with thin pale tail-bands; white below

with fine rufous-grey barring, except for solidly deep rufous flanks and thighs.

This enormous variation, coupled with slight differences in proportions, has resulted in recent tendency to treat what is here termed the 'Central and South American group' as three species (see heading above for English names) distinct from the Caribbean, North American and Mexican Sharp-shinned Hawk. In that case, all clearly form a superspecies, but we have preferred to retain them here as a single species (showing the dividing lines on the map). All are geographically isolated by lowlands because, in the tropics, the resident populations are characteristically montane. Even so, there is evidence of gene-flow between the highly variable *ventralis* and the nearest *erythronemius* (see Wattel for discussion of this and of polymorphism in *ventralis*). At the same time, the Caribbean races – especially *venator* – are similar to the eastern South American *erythronemius* in many ways. The Central American *chionogaster* is smaller and strikingly plainer black and white than its neighbours; it and the dimorphic and slightly differently proportioned *ventralis* in Andes have perhaps the strongest cases for treatment at the species level. (That *chionogaster* remains distinct from migrant *velox* passing into and through its range is irrelevant: many other examples of migrant populations passing through ranges of conspecifics without mixing.)

**MEASUREMENTS** *A. s. striatus* ♂ wing 141–143 mm, ♀ 181–186 mm. *A. s. fringilloides* ♂ wing 157 mm (one), ♀ 178–185 mm (two). *A. s. venator* ♂ wing 157 mm (one). *A. s. velox* ♂ wing 161–178 mm, ♀ 191–206 mm; ♂ tail

130–139 mm, ♀ 149–162 mm; ♂♀ tarsus 45–59 mm. *A. s. perobscurus* ♂ wing 174 mm (one), ♀ 206 mm (one). *A. s. suttoni* ♂ wing 170–192 mm, ♀ 216–229 mm; ♂ tail 131–150 mm, ♀ 165–177 mm. *A. s. chionogaster* ♂ wing 166–175 mm, ♀ 198–209 mm; ♂ tail 130–135 mm, ♀ 156–164 mm; ♂♀ tarsus 50–57 mm. *A. s. ventralis* ♂ wing 152–178 mm, ♀ 190–217 mm; ♂♀ tail 150–188 mm, tarsus 50–56 mm. *A. s. erythronemius* ♂ wing 163–170 mm, ♀ 190–195 mm. **Weights** *A. s. velox* ♂ 82–125 g, ♀ 144–218 g. *A. s. ventralis* ♂ 90 g (one), ♀ 219 g (one).

**REFERENCES** Belton (1984), Blake (1977), Bowles (1930), Cabot & Serrano (1986), Clark (1984, 1985b), Clark & Wheeler (1987), Contreras *et al.* (1990), Cruz & Delannoy (1983), Delannoy (1982), Delannoy & Cruz (1988), de la Peña (1992), Duncan (1980), Evans & Rosenfield (1985), Fischer (1984), Fisher (1893), Fjeldså & Krabbe (1990), Friedmann (1950), Garrido (1985), Gore & Gepp (1978), Harwood (1975), Henny *et al.* (1983), Hilty & Brown (1986), Holthuizen *et al.* (1985), Howell & Webb (1995), Johnsongard (1990), Jones (1979), Klimaitis & Moschione (1987), Land (1970), McAtee (1935), Meyer de Schauensee & Phelps (1978), Monroe (1968), Moore & Henny (1983), Mueller & Berger (1967a), Mueller *et al.* (1979a/b, 1981), Murray (1964), Navas & Bó (1991), Noble & Elliott (1990), Olrog (1985), Palmer (1988), Parker *et al.* (1982), Platt (1976c), Reimsen & Traylor (1989), Reynolds (1989), Reynolds & Meslow (1984), Reynolds & Wight (1978), Reynolds *et al.* (1982), Ridgely & Gwynne (1989), Rosenfield *et al.* (1991), Rust (1914), Sick (1993), Slud (1964), Smith *et al.* (1990), Snyder & Snyder (1979), Snyder & Wiley (1976), Snyder *et al.* (1973), Stiles & Skutch (1989), Storer (1952, 1954, 1966), Swann (1922), Wattel (1973), Wetmore (1941, 1965), Wheeler & Clark (1995), Wiggers & Krutz (1991), Wiley (1985).

## 148 BICOLOURED HAWK

### *Accipiter bicolor* (Vieillot, 1817)

Plate 50

Proposed name: Bicoloured Sparrowhawk

**DISTRIBUTION** Neotropical (22°N to 55°S); order 6; rare to scarce, but widespread, if patchy, and probably under-recorded. Central and South America: southeast Mexico (perhaps south Tamaulipas, but mainly Veracruz through Oaxaca, Chiapas and Yucatán Peninsula), very patchily through Central America and probably more commonly from west Colombia through west Ecuador to northwest Peru (Lambayeque); and, east of Andes, from north Colombia, Venezuela and Guianas south through much of Brazil to east Ecuador and Peru, Bolivia, Paraguay, and northern Argentina (south to La Rioja and Entre Ríos); then, after a gap of 800 km, on both sides of Andes in south Chile and southwest Argentina (O'Higgins and Neuquén to Tierra del Fuego and Isla de los Estados [Staten Island]).

**MOVEMENTS** Probably sedentary or at most nomadic in much of range. But evidently some altitudinal movement in Andes, while southern populations of Chile and Argentina believed to be migratory, or at least partly so, moving north to the latitudes of central Chile (as far as Santiago), March–September, though claims that this southern form reaches northwest Argentina, thus filling

the distributional gap, are unsubstantiated. Eastern race has also been recorded in Uruguay.

**HABITAT** Associated with humid tropical forest, but mostly at edges, around natural clearings or native villages, and near rivers or lakes, or in dense galleries with adjacent open country; also open deciduous woodland and wooded savannah, and adapts to thinned areas, plantations and other secondary growth; chiefly in tropical lowlands, usually avoiding dry forest, but extending up into subtropical foothills and, more locally in Venezuela and Colombia south to Argentina, even temperate mountain zone and drier lowlands. In south Chile and Argentina, widespread in mosaics of temperate wet forest, especially southern beech *Nothofagus*, and open country or scrub. Mostly sea-level to 2,000 m, but to 2,500 m in Venezuela, 2,300 m in Bolivia and over 2,700 m in Peru, while regularly to 2,500 m in northwest Argentina, where has nested at 2,700 m; temperate-nesting southern race up to 1,000 m.

**FIELD CHARACTERS** Medium-sized to largish accipiter, highly variable in plumage, with shortish rounded wings, longish rounded or bluntly wedge-tipped tail, and long legs and toes. Often shy and secretive, remaining

*kou-kou-kou...* Faster scolding *kek-kek-kek...* near nest. Other sounds described include long, unbird-like, throat-clearing groan; and soft clear whistle from male near fledged young; young utter scratchy screaming *keeyaaa*.

**FOOD** Chiefly birds; also small mammals, lizards, large insects. Birds include especially thrushes *Turdus*, mockingbirds *Mimus* and smaller doves, but southern race (females?) also takes larger Chilean Pigeons *Columba araucana*. Mainly still-hunts from concealed perch at any height from lower understorey upwards, but also flush-hunts by flying through canopy or lower storey, or by stopping only briefly on each of series of perches, then chasing any potential prey put up. Will fly into fruiting tree full of birds, then dash off after selected victim. Said sometimes to hunt in pairs. One in Brazil joined band of capuchin monkeys *Cebus* to catch insects disturbed by them [cf. kites 14, 35].

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Soars, sometimes high, at least in breeding season, but no descriptions of other aerial displays.

**BREEDING** October/November–January in Chile and Argentina, probably February/April–June (at least) in Colombia and Venezuela, late dry to early wet season in Costa Rica, from mid dry season in Guatemala. Small cup-shaped nest of twigs c30–40 cm across, lined with leaves or moss, high in forest tree (one at 12 m near end of branch) or in mass of epiphytes. Clutch 1–4 (fewer in tropics). Incubation 33–37 days (tentatively quoted at 20–21 days by Brown & Amadon, but this too short). Fledging 30–36 days, young remaining near nest for further two months or more.

**POPULATION** Although generally regarded as rare to uncommon or, at best, scarce over much of its range, it is evidently more numerous in some central and southerly areas (even 'especially common' in northwest Argentina: Olrog). Moreover, its distributional limits enclose over 12 million km<sup>2</sup>; that includes much unsuitable open or urban habitat and forest that is too dry or too unbroken, but even an average density of only 1 pair/100 km<sup>2</sup> would give a total population well into six figures. In French Guiana at least 4 birds/100km<sup>2</sup> estimated at one forest site, and at Petén, Guatemala, average inter-nest distance 3.1 km. Said by Olrog to be 'little influenced by extensive clearing', a statement repeated by others. Total deforestation must clearly be detrimental, but the species is apparently scarce in dense forest and, thus, partial clearance resulting in a mosaic of relict forest, shelterbelts, plantations and scrub may well favour it.

**GEOGRAPHICAL VARIATION** Colour of underparts geographically very variable and, particularly in east Bolivia and west Paraguay, locally highly complicated; at least northern nominate race might be described as

polymorphic. Five races usually recognised, but south Mexican *fidens* dubiously distinct.

*A. b. bicolor* (from south Mexico, east of Tehuantepec, south on both sides of Andes to Peru, northwest Bolivia and Amazonia) Darkish grey cheeks and uniformly grey underbody, but latter varies from very pale to almost as dark as back (dark birds usually have obscurely barred crissum and thinner tail-bands); wing-linings pale and mottled.

*A. b. fidens* (south Mexico, west of Tehuantepec) Similar, but may average larger.

*A. b. pileatus* (east Brazil, east Paraguay and extreme northeast Argentina) Pearl-grey to pale brownish-grey below, this colour extending to cheeks and separate nuchal collar; wing-linings rufous.

*A. b. guttifer* (southeast Bolivia, southwest Brazil, west Paraguay and northern Argentina) Paler grey cheeks and, otherwise, most typically rufous with white barring, apart from more or less greyer throat and chest, but underbody varies from almost plain grey, with slight rufous wash or indistinct white spots, to rufous with grey throat, or multibanded (like more rufous variety of next race).

*A. b. chilensis* (Andean region of south-central and south Chile and Argentina, some wintering slightly northwards) Various barred below with grey, rufous, brown and white (usually predominantly grey, but others more rufous), with variable but sometimes broad shaft-streaks.

This last isolated southern race is sometimes treated as a separate species, alone or with *guttifer*, but the latter's great variability and apparent intergrading with eastern *pileatus* argues for the whole complex to remain as one. Forms a superspecies with Cooper's and Gundlach's Hawks [149, 150]

**MEASUREMENTS** *A. b. bicolor* ♂ wing 197–216 mm, ♀ 231–253 mm; ♂ tail 162–180 mm, ♀ 186–205 mm; ♂ tarsus 56–60 mm, ♀ 63–69 mm. *A. b. fidens* ♂ wing 219 mm (one), ♀ 251–260 mm (two). *A. b. pileatus* ♂ wing 190–216 mm, ♀ 245–264 mm. *A. b. guttifer* ♂ wing 206–220 mm, ♀ 246–265 mm. *A. b. chilensis* ♂ wing 203–219 mm, ♀ 237–276 mm. **Weights** *A. b. bicolor* ♂ 204–250 g (three), ♀ 342–454 g (three); or average 260 g and 400 g (Stiles & Skutch).

**REFERENCES** Amadon (1964), Belton (1984), Blake (1977), Contreras *et al.* (1990), Cuello & Gerzenstein (1962), de la Peña (1992), Fjeldså & Krabbe (1990), Friedmann & Smith (1935), Hellmayr (1932), Hellmayr & Conover (1949), Hilty & Brown (1986), Howell & Webb (1995), Humphrey *et al.* (1970), Jaksic & Jiménez (1986), Johnson (1965), Meyer de Schauensee & Phelps (1978), Monroe (1968), Olrog (1949, 1985), Quixchán *et al.* (1992), Ridgely & Gwynne (1989), Salaman (1994), Sick (1993), Stud (1964), Stiles & Skutch (1959), Terborgh (1983), Thiollay (1988, 1989a/b, 1991a), Thorstrom *et al.* (1991), Vuilleumier (1985), Wattel (1975).

## 149 COOPER'S HAWK

*Accipiter cooperii* (Bonaparte, 1828)

Plate 49

Other name: Chicken Hawk

Proposed name: Cooper's Sparrowhawk

**DISTRIBUTION** Nearctic (54°N to 23°N, possibly still to 18°N) and, in winter, also marginally Neotropical (to

**CONFUSION SPECIES** Smallest males, especially in west, not so much bigger than largest females of strikingly similar-plumaged North American and north Mexican races of Sharp-shinned Hawk [147], but latter clearly slimmer (well under half as heavy), with smaller, rounder head, eyes set centrally, relatively longer wings, shorter and more squared (or even notched) tail with much thinner white tip, and notably stick-like legs; flies more buoyantly with faster beats, head projection small in glide, and always soars on level wings; adult lacks Cooper's capped appearance and is generally darker on back; juvenile has clearer supercilia, browner cheeks, fewer whitish mottlings above, coarser streaking below extending more to belly. Only other accipiter in most of range is Northern Goshawk [153], but even smallest male clearly larger, with longer and broader-based wings, shorter tail, giving more *buteo*-like shape; adult also has broad supercilia and grey throat to breast, while juvenile much paler-edged above, including panel formed along larger wing-coverts, and more heavily streaked below (thin streaks often extend even to crissum), with less regular tail-banding. (See also fig. 40 on p. 597.) In south-east Mexico and Central America, see Bicoloured Hawk [148] (comparable size, but both adult and juvenile of relevant population plain below without bars or streaks). Consider also three small *buteos* which, especially as juveniles, can look accipiter-like: Grey-lined [185], Roadside [186] and Red-shouldered [189]. Note that adult Broad-winged [190] is similarly rufous-banded below.

**VOICE** When breeding, harsh cackling *keh-keh-keh...*, male higher and faster; many softer calls in domestic situations. Fledged young have penetrating hunger-call, *tee-ar*. Generally silent on passage and in winter.

**FOOD** Often predominantly smallish birds, but regionally also many small mammals and, in drier areas, lizards; occasionally frogs and insects, exceptionally fish in nearly dry watercourses. Birds form 50–85% of prey and range from New World warblers (Parulidae) to pigeons, even ducks and gamebirds as big as Teal *Anas crecca* and Ruffed Grouse *Bonasa umbellus*, but mainly such medium-sized groups as quails (Odonophorinae), woodpeckers, American Robin *Turdus migratorius*, icterids and European Starling *Sturnus vulgaris*; also many nestlings and fledglings in summer and sometimes half-grown poultry. Mammals especially squirrels and chipmunks, but also rabbits and young hares, mice, occasionally bats. Mean weight of prey of males calculated at 37.6 g and of females 50.7 g (Storer). Still-hunts from hidden or, in some parts, more open perch, or makes transect-flights to surprise prey along fences and forest edges, and through or over woodland; will chase into cover, or from bush to bush; recorded flushing quail in grass on foot, and catching higher-flying birds and bats in air.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs; migrates singly, or in groups of two to four, often loosely with other raptors. Single or mutual high-circling frequent, especially early in breeding season, when slow-flapping also regular.

**BREEDING** From February in southern USA and Mexico, but mostly April–July. Bulky platform of twigs, c65–75 cm across and 15–45 cm deep (often shallower in conifer, deeper in broadleaf), lined with flakes of bark and odd pieces of greenery, at 8–20 m in main fork or on horizontal branch close to trunk of forest or woodland tree, often near water. Clutch 4–5 (3–6). Incubation 30–36 days. Fledging 27–34 days (males earlier), but return to nest and not fully feathered until c50 days.

**POPULATION** Organochlorine residues caused serious declines from late 1940s to 1970s, especially in eastern USA, and long-term survival of this essentially North American species was seriously questioned. Subsequent restrictions on pesticide usage allowed recovery. By mid 1980s Cooper's was regarded as 'uncommon to fairly common' over most of breeding range, and by 1990s as regionally common, particularly in west (though still only 'uncommon to frequent' in Mexico); numbers seen on migration also increased. As breeding range extends over nearly 8 million km<sup>2</sup>, only 1 pair/160 km<sup>2</sup> would be needed for six-figure population.

**GEOGRAPHICAL VARIATION** Monotypic, but cline of slightly decreasing size from east to west. Forms a superspecies with Bicoloured and Gundlach's Hawks [148, 150]: the three replace each other geographically and have comparable morphology.

**MEASUREMENTS** ♂ wing 214–238 mm, ♀ 247–278 mm; ♂ tail 172–180 mm, ♀ 203–205 mm; ♂ tarsus 61–73 mm, ♀ 66–76 mm. **Weights** ♂ 235–402 g, ♀ 413–678 g.

**REFERENCES** Bielefeldt & Cary (1991), Bielefeldt *et al.* (1992), Blake (1977), Clark (1984), Clarke & Wheeler (1987), Errington (1933), Evans (1982), Hamerstrom & Hamerstrom (1951), Henny & Wight (1972), Henny *et al.* (1983), Hill & Brown (1986), Hoffman *et al.* (1992), Howell & Webb (1995), Janik & Musher (1982), Johnsgard (1990), Jones (1979), Kennedy & Johnson (1986), Leopold (1944), Mead (1963), Meng (1959), Millsap (1981a), Moore & Henny (1983), Musher (1989), Mueller *et al.* (1979b), Murphy *et al.* (1988), Palmer (1988), Reynolds (1989), Reynolds & Meslow (1984), Reynolds & Wight (1978), Reynolds *et al.* (1982), Rosenfield & Bielefeldt (1993), Rosenfield *et al.* (1991), Slud (1964), Smith (1963), Smith *et al.* (1990), Snyder (1974b), Snyder & Snyder (1970), Snyder & Wiley (1976), Snyder *et al.* (1973), Stahlecker & Beach (1979), Sules & Skutch (1989), Storer (1966), Titus & Musher (1981), Toland (1985a), Wattel (1973), Whaley & White (1994), Wheeler & Clark (1995), Wiggers & Krutz (1991).

## 150 GUNDLACH'S HAWK

*Accipiter gundlachi* Lawrence, 1860

Plate 50

Other name: Cuban Hawk  
Preferred name: Gundlach's Goshawk

**DISTRIBUTION** Neotropical, in Caribbean (22.5°N to

20°N); order 3; although thought on verge of extinction in 1960s, now known still to have been quite widespread then, but has since declined in numbers and contracted in range to extent where currently regarded as

endangered. West Indies: endemic to Cuba, largest of Caribbean islands.

**MOVEMENTS** Apparently sedentary, and no evidence of mixing between remaining fragmented populations. (Record from Archipiélago de los Canarreos, near Isla de la Juventud [Isle of Pines], now attributed to migrant Cooper's Hawk [149].)



**HABITAT** Variety of forest, forest edge, open woodland, marshy forest, even mangrove, formerly also marshes with isolated trees; still forages over more open country and swamps. In east Cuba generally in more mature forest, both dry and humid, as well as pine, riverine and cloud forest. Sea-level to 800 m.

**FIELD CHARACTERS** Largish to large, stocky accipiter, mostly blue-grey, brownish and rufous, with heavy bill, eyes set well forward in large squarish head, rounded wings, long rounded tail, and long, thick legs and toes. Shy and secretive, perching within cover, wing-tips just exceed tail-coverts. Sexes similar, but female at least 7–11% larger, with proportionally longer tail and more powerful feet; juvenile distinct.

**PERCHED Adult** Bluish-grey above (females slightly brownish-tinged) with blacker crown; tail banded dark brown and grey; cheeks and chest brownish-grey or grey, and rufous abdomen and thighs obscurely or distinctly white-barréd (see Geographical Variation), always with contrasting white undertail-coverts. **Juvenile** Dark brown above, edged rufous and with some white spots and bars; still darker crown, dusky-streaked cheeks and rather paler nuchal collar give hooded effect, often with short pale supercilia; tail banded brown and dark brown; all creamy-buff below with variably heavy dark to blackish streaks (least on crissum) and underlying rufous-brown bars (especially on flanks, and darker on thighs). **Bare parts** Adult eyes orange to orange-red, juvenile greenish-yellow. Adult cere dark-grey or green-grey, juvenile greenish or yellowish (see Geographical Variation). Adult legs yellow, juvenile paler.

**FLIGHT** Smallish to small-medium raptor with accipiter proportions (p.516), but well projecting head, mid-length rounded wings, and relatively long rounded tail; wingspan 1.8 times total length. Flight probably very like that of Cooper's Hawk [149] of North America, with stiff beats, level glides, and soaring on straight wings flat or slightly raised, but not described in detail. General

impression in all plumages from below is of well-marked or strongly coloured body and wings, but plainer and paler tail as well as tail-coverts. **Adult** Blue-grey above, but blackish cap, banded tail with clear white tip; below, brown-grey to grey cheeks and chest, white-barréd rufous abdomen and wing-linings, dark-barréd whitish flight-feathers, pure white crissum and, unless spread, rather uniformly greyish tail with white tip and dark subterminal blotch (this because outermost feathers are nearly plain or, at most, obscurely banded). **Juvenile** Dark brown above (rufous edges and white mottling probably inconspicuous in flight), with hooded effect from dark cheeks and paler collar; brown-banded tail; heavily marked below, with bold dark streaks and underlying paler cross-bars on body and linings, and barréd flight-feathers like adult, but creamy-buff crissum only lightly streaked and, if closed, pale brownish tail very thinly barréd (again because of lightly patterned outermost feathers).

**CONFUSION SPECIES** Only other Cuban accipiter is small rufous-cheeked endemic race (*ringillouleyi* of Sharp-shinned Hawk [147]); apart from distinctions in colours of crown and cheeks and in pattern of underparts, and even greater divergence in size, this differs from Gundlach's in shape and actions in much the same ways as does North American Sharp-shinned from Cooper's Hawk [149] (smaller rounded head with centred eyes, shorter squared tail, quicker beats, more buoyant flight, little head projection while gliding). But it should be remembered (see Movements) that Cooper's Hawk could itself reach Cuba as rare vagrant (much whiter underparts with rufous barring, no grey on cheeks and chest, juvenile paler and less heavily marked in flight below except for barréd outer tail-feathers). Only other possible confusions, despite their shorter tails and different shapes, are the local buteos, Red-tailed [202] and, more particularly, Broad-winged [190].

**VOICE** Loud *kek-kek-kek*... Range of calls probably comparable to that of Cooper's Hawk [149], but apparently not analysed in detail. Probably noisy only in courtship and if disturbed at nest, when utters harsh cackling.

**FOOD** Exclusively birds, so far as is known. These are mainly medium-sized: males tend to take smaller doves (e.g. *Zenaidra*) and Red-legged Thrushes *Turdus plumbeus*, while females concentrate on larger pigeons *Columba* and also Cuban Parrots *Amazona leucoccephala*. Other wild species recorded include Northern Bobwhite *Colinus virginianus* (common prey of related Cooper's Hawk [149] in southern USA), nighthawk (probably *Chordeiles minor*) and, largest of all, Cuban Crow *Corvus nasicus*, the list also includes domestic pigeons and, unfortunately, poultry (of which this species is locally considered a serious predator). Watches from hidden perches, but most prey caught by rapid chases over swamps and open country (typical of the larger females) or through trees and forest undergrowth (typical of the smaller and more mobile males); recorded chasing pigeon into open stable and even entering poultry-farm installations on foot.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Apart from infrequent soaring, no descriptions of other aerial displays.

**BREEDING** Building from January, laying from



distribution often patchy and species absent from many suitable forest areas: even so, a mid-scale allowance of 75 km<sup>2</sup>/pair would give population in the hundreds of thousands. Thought probably to be decreasing through deforestation in West Africa and other tropical areas, but readily adapts to mature eucalyptus and other plantations in southern Africa, where, as a result, distribution now takes in what were open plains. On other hand, known to carry high levels of pesticides in some parts of southern Africa, where there are local reductions in some 'non-natural' habitats.

**GEOGRAPHICAL VARIATION** Two races.

*A. m. melanoleucus* (eastern and southern Africa from Sudan and Ethiopia south, after a gap, to Angola and South Africa) Large; melanistic morph rare.

*A. m. temminckii* (east Liberia to Central African Republic, Gabon, PR Congo and north and west DR Congo) Smaller, sex for sex, with more mottled flanks; melanistic morph unknown.

Populations from eastern DR Congo somewhat intermediate. Because of marked similarity of juveniles,

species has been regarded as African representative of Northern Goshawk [153] and its possible allospecies, but this is essentially a very large 'sparrowhawk' with long tarsi and toes.

**MEASUREMENTS** *A. m. melanoleucus* ♂ wing 285–308 mm, ♀ 333–344 mm; ♂ tail 210–229 mm, ♀ 256–267 mm; ♂ tarsus 72–78 mm, ♀ 83–90 mm. *A. m. temminckii* ♂ wing 251–273 mm, ♀ 290–310 mm; ♂ tail 190–207 mm, ♀ 228–241 mm. **Weights** ♂ 430–490 g, ♀ 650–980 g; *A. m. melanoleucus* unsexed 476–980 g (19).

**REFERENCES** Barlow *et al.* (1999), Benson & Benson (1973), Black & Row (1970), Britton (1980), Brusset (1973, 1977), Brusset & Eard (1986), Brown & Brown (1979), Brown *et al.* (1982), Craib (1983), Ginn *et al.* (1989), Grimes (1987), Hart (1977), Hartley (1976), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957–73), Maclean (1993), Pakenham (1979), Pickford *et al.* (1989), Pinto (1983), Pringle (1971), Savage & Rodwell (1998), Simmons (1986a), Snelling *et al.* (1984), Steyn (1982), Tarbton & Allan (1984), Tarbton *et al.* (1978, 1989), Thiollay (1978c), Thomsen (1991a), Wattel (1973).

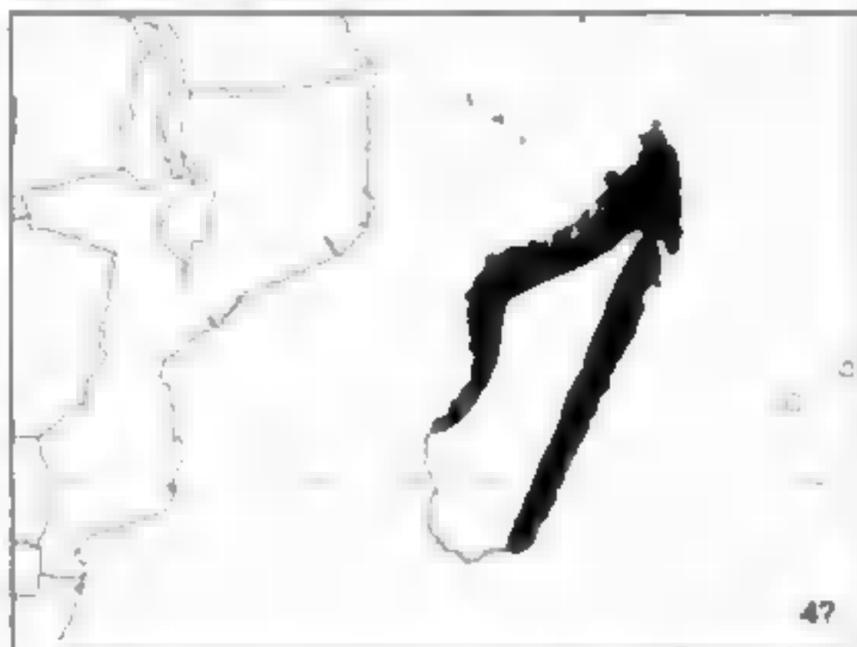
**152 HENST'S GOSHAWK**  
*Accipiter henstii* (Schlegel, 1873)

**Plate 38**

Other name: Madagascar Goshawk

**DISTRIBUTION** Malagasy (12°S to 25°S); order 4; generally considered scarce to rare, but perhaps locally more numerous. Endemic to Madagascar: found in north, west (down to about 21°S) and east (south to region of Ranomalana in southeast corner).

**MOVEMENTS** Probably sedentary, though immatures may be more dispersive.



**HABITAT** Mainly primary forest, both humid and dry, sometimes secondary woodland and well wooded savannah, especially tree-grown stream-sides. Usually undisturbed or only slightly degraded areas, but also occurs in large eucalyptus plantations (breeding even recorded). Occasionally seen near open spaces. Sea-level to 1,800 m.

**FIELD CHARACTERS** Large to very large accipiter, adults slate above and barred below and juvenile respectively browner and streaked, both with pale supercilia,

heavy bill, short rounded wings, long tail, long legs and thick toes. (Both adult and juvenile rather similar to corresponding plumages of Northern Goshawk [153]; size also comparable, though shorter-winged and longer-legged.) Often perches in cover, when rarely visible below canopy and best located by call (see Voice), but sometimes seen on open branches by forest tracks; wing-tips barely exceed uppertail-coverts. Sexes very similar, but female 12–20% larger; juvenile easily distinguishable. **PERCHED Adult** Dark brownish-slate above with slight and somewhat speckled supercilia, obscure tail-bands; white below, all finely but strongly barred blackish (more coarsely on female). **Juvenile** Paler brown above, all edged rufous-buff, with clearer supercilia, and bold dark tail-bands reducing intervening brown to thin bars; whitish to pale rufous below, boldly streaked and blotched dark brown. **Bare parts** Adult eyes yellow, juvenile paler. Cere greenish-yellow. Feet yellow.

**FLIGHT** Rather large raptor with accipiter proportions (p.516), but particularly short rounded wing-tips, longish tail; wingspan 1.6 times total length. Strong beats punctuated with glides on flat wings. **Adult male** Dark brownish-slate to brown above; and narrowly but evenly dark-banded below, including wing-linings and, though more sparsely, undertail-coverts [cf. Madagascar Sparrowhawk 144]; barring on grey underside of tail mainly obscure, though subterminal band slightly more obvious; barred wing-linings look darker than faintly banded grey undersides of flight-feathers. **Adult female** Very similar except in size, but differs in having dark bands on primaries and outer secondaries; only inner secondaries look paler than wing-linings. **Juvenile** Paler brown above, with obvious pale feather-fringes; underbody boldly streaked, but wing-linings strongly barred and flight-feathers and tail clearly banded.

**CONFUSION SPECIES** Although similar in general

in central North America down only to southern Canada and Great Lakes, north of Great Plains); and across Eurasia (most countries of Europe except Ireland and Iceland, east across Siberia to Anadyr and Kamchatka, south to extreme northwest Morocco, Corsica and Sardinia, toe of Italy, southern Greece, Turkey and Caucasus, Ukraine, northern Kazakhstan, Mongolia, Manchuria and Japan); also in mountains of Sinkiang's Tien Shan and of western China, south possibly to Tibet and northwestern Himalayas.

**MOVEMENTS** Generally considered rather sedentary, but both adults and immatures dispersive in late summer, while arctic and subarctic populations tend to move southwards and those of mountains to lower ground, end September/November–February/April, even though some remain north to 65°–70°N throughout winter. Recoveries of Fennoscandian birds up to 1,640 km, but few adults over 300 km; central European birds travel much smaller distances, few over 50 km, exceptionally to 300 km or more. Thus, winter distribution does not extend so much farther south than summer range. In North and Central America, simply fills in south to Mexico's Baja California and Sinaloa (rarely), and into west Texas, but otherwise generally down only as far as Nebraska, Iowa, northern Illinois and Indiana, east Tennessee and western North Carolina, apart from periodic eruptions almost to Gulf of Mexico every ten years or so. In Eurasia, very small numbers cross Straits of Gibraltar and Bosphorus in autumn but, farther east, there appear to be more significant winter range extensions from northern Iran and southern Turkmenia northeast to Lakes Aral and Balkhash, and from Kashmir to Assam, extreme northwest Thailand, north Vietnam and south China, Taiwan, Nansei-shoto (Ryukyu Islands) and South Korea. Vagrants recorded Ireland; central Morocco and northern Algeria, Tunisia, Libya and Egypt; Israel, Jordan, Saudi Arabia, south Iran, Pakistan, west India (Gujarat); and on Izu-shoto (south of Japan) and Commander Islands.

**HABITAT** Tall forest or woodland, mostly coniferous (especially spruce), but also pine-oak, other mixed, and pure broadleaf (notably beech and oak), preferring vicinity of edges, clearings, tracksides, streams and similar openings; also broken or part-felled forest, and small woods in cultivated areas. In far north extends to open forest-tundra, and in central Asia to wooded steppe and riverine galleries, locally also close to villages, towns and even cities; since late 1980s has also adapted to parks in several major European cities (e.g. Amsterdam, Cologne). In UK and warmer parts of continental Europe, shows preference for north-facing slopes. In winter, juveniles (rather than adults) may occur in more open scrub or parkland. In north Holarctic, mostly sea-level to 1,000 m, but montane populations in continental Eurasia and America mainly between 1,000 m and 3,000 m, often descending to lower levels in winter.

**FIELD CHARACTERS** Large accipiter, as adult usually grey-brown to blue-grey above and more or less closely barred below, with sizeable bill, relatively long wings, medium-length tail rounded or wedge-tipped, and short thick legs and toes. Generally secretive, perching inconspicuously within canopy, but sometimes more openly in early morning, when juvenile in particular may stay

on exposed branch or stump; wing-tips about half down tail. Sexes rather similar, but females of different races mostly 11–15% larger (up to 28%) and 50–90% heavier; RSD less in American group, where corresponding figures 6–10% (up to 18%) and up to 30% (in nominate *gentilis* largest female nearly four times as heavy as smallest male, but in *atricapillus* less than twice); juvenile distinct; much as adult when fully moulted, but has intermediate stage through second year.

**PERCHED Adult male** Dark grey-brown, locally even blackish-brown, to blue-grey or pale grey above (different races: see Geographical Variation), with usually contrastingly darker blackish to black crown and ear-coverts, these separated by thin or thick white supercilia (more conspicuous in north Eurasian and, especially, American races); brown to dark grey tail has thin white tip (lost in worn plumage) and three to five broad but not well-defined blackish bands; all closely dark-banded below (ground colour of different races varying from white to buff or pale grey, and bars from brown to blackish or dark grey as well as from broad to narrow or vermiculated), except for whitish throat with dark shaft-streaks (which may continue across barring of rest of underparts, notably in American races) and conspicuous plain white or greyish undertail-coverts. **Adult female** Generally noticeably larger (slight overlap); not separable on plumage alone, though tends to be browner above, more often with white flecks on ear-coverts, and more coarsely barred below, bars sometimes extending to undertail-coverts. **Pale morph adult** In Siberia (*butoides* and, more particularly, *albidus*), pale morphs increase in numerical proportion and whiteness towards northeast (where 50%); these range from whitish with pale brown streaks above and barring below to more or less pure white. **Juvenile** Brown above, streaked rufous to buff on head and variably edged on back and wings (edges reduced with wear, and broader in American and arctic Eurasian races, which may look much more mottled, with whitish feather-bases forming pale patch on scapulars and larger wing-coverts); usually shows pale supercilia, but these often thin and indistinct, and light patch on hindneck; brown tail has broader pale tip of rufous-white, and four to five dark bands which are made more clear-cut when edged with whitish or pale rufous (most obviously in American and arctic Eurasian races); very variably white, cream, buff or cinnamon-rufous below, all boldly but equally variably marked with drop-like streaks that broaden into arrowheads on flanks and become much narrower on thighs and crissum, with undertail-coverts sometimes plain. **Second-year** Variable intermediate stage with buff forehead, some brown feathers remaining on upperwing-coverts and lower back, and mixture of brown streaks and bars on breast; juvenile flight-feathers and tail may be retained well into second winter. **Bare parts** In Eurasia, adult eyes yellow until three to four years old, then male orange-red, female orange-yellow; in America, orange to deep red; juvenile greenish-grey, becoming greenish-yellow and then yellow. Adult cere greenish-yellow, juvenile greener at first. Legs yellow.

**FLIGHT** Mid-sized raptor with accipiter proportions (p.516), but more protruding head, deeper chest and relatively longer and broader wings which, though still round-tipped, are given tapered or even pointed effect

by narrower hands that have fingers more closed in steady flight, while rounded or wedge-tipped tail, already only of medium length for accipiter, is made to look shorter by wing breadth: as result, female in particular has something of character of *buteo*, though hands more tapered, tail not so short, head narrower and more obviously projecting; wingspan 2.0 times total length. Still strong beats, slower than smaller accipiters, interspersed with short or sometimes long glides on level wings, carpals thrust slightly forward and trailing edges often scurved; soars on flat to slightly raised wings, often (but far from always) with tail well spread. **Adult** Shades of grey-brown or grey above (becoming greyer eastwards in Eurasia, paler to much paler in Arctic and more blue-grey in North America; see Geographical Variation), with blacker cap and ear-coverts divided by more or less conspicuous supercilia, and three to five dusky but often not very obvious tail-bands; underbody and wing-linings white to buff or pale grey, all closely and more or less finely dark-banded (looking more dappled or even almost uniformly grey on American races, which have thin dusky vermiculated barring and fine shaft-streaks), except for streaked throat and often conspicuous white or whitish undertail-coverts; more widely spaced and often inconspicuous bars on whitish-grey flight-feathers, but tail-bands clearer and bolder, subterminal broadest. **Pale morph adult** More or less whitish, with variable indications of dark streaks above and barring below, to pure white (see previous paragraph and Geographical Variation). **Juvenile** Although basically dark brown above, looks all streaked and scalloped as result of rufous-buff edges, these often broadest on scapulars and

larger wing-coverts, where they can form obvious extensive pale patch or mid-wing diagonal (especially American and arctic Eurasian races); supercilia and pale patch on hindneck variable (least in smaller and less northerly Eurasian races, where often indistinct and no more conspicuous than other streaking); tail more clearly marked than adult's, with broad rusty-white or buff tip and four to five clearer blackish bands that in some populations (especially North American and some arctic Eurasian) form uneven zigzag pattern variably highlighted by thin white edges; white to pale rusty underbody and wing-linings boldly streaked with dark drops and arrowheads, both ground colour and markings usually being darkest and boldest on foreparts and palest and thinnest on thighs and crissum, which may be pale creamy-white and almost plain; tail pattern less clear from below, because ground colour paler, but barring on flight-feathers much stronger than adult's. **Second-year** May be difficult to distinguish in flight, but juvenile remiges and rectrices sometimes retained long after body and wing-coverts moulted.

**CONFUSION SPECIES** Large size, and length and breadth of wings, give female different jizz from other sympatric accipiters. In North America, smallest males overlap in total length (but not wingspan or bulk) with largest female Cooper's Hawks [149]; adults distinct enough on plumage, but juveniles can look similar (Cooper's always relatively shorter-winged and longer-tailed, wing-tips covering only tail-base when perched and span obviously less, head squarer, back darker-looking and much less mottled, underbody more neatly

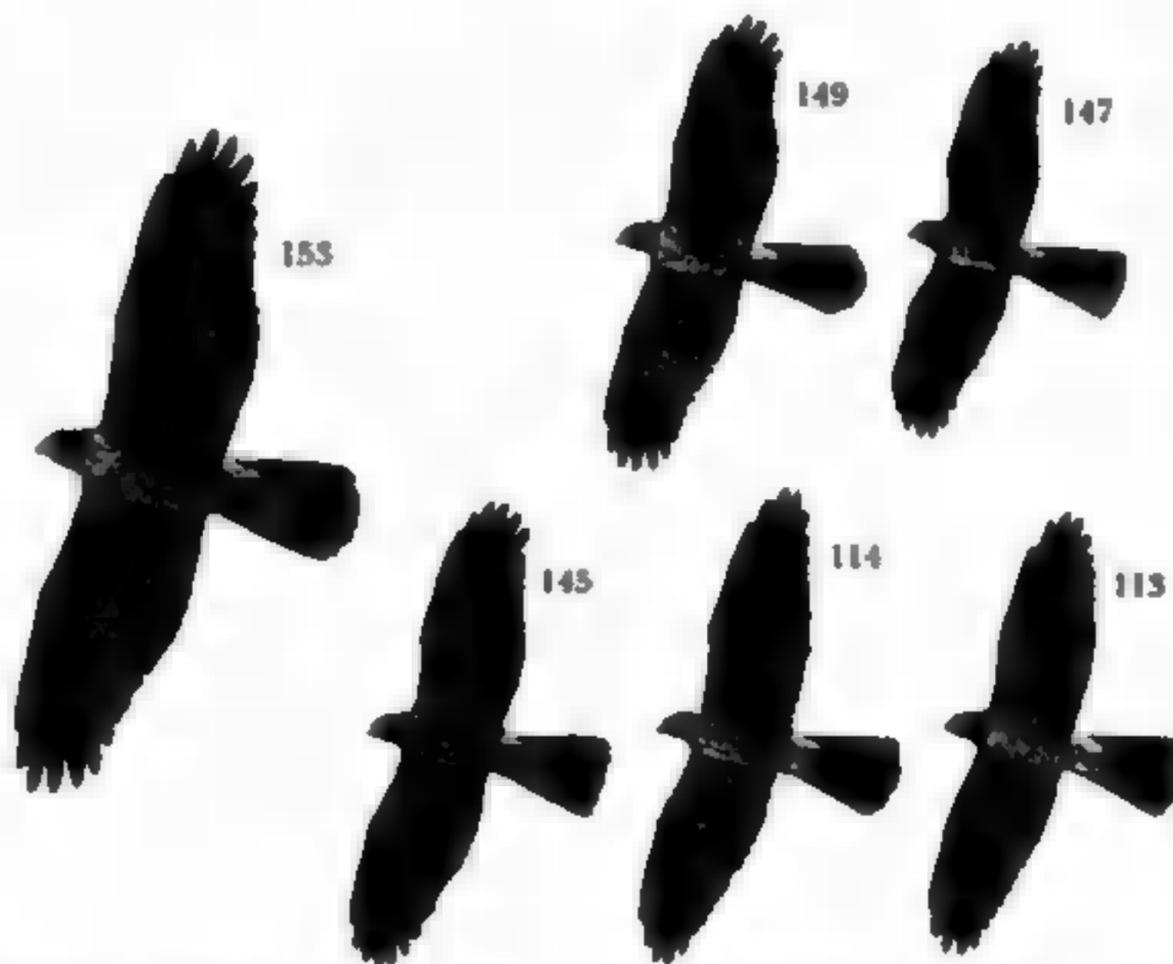


Fig. 40. Flight silhouettes of Northern Goshawk with two other nearctic and three other West Palearctic accipiters (it and Cooper's Hawk show the smaller males, the other four the larger females, for closer size comparison). **HOLARCTIC** Northern Goshawk *Accipiter gentilis* [153]: protruding head; deep chest; relatively long wings with tapering tips and bulging secondaries; round-tipped tail. **NEARCTIC** Cooper's Hawk *A. cooperii* [149]: squarish projecting head; rather straight leading edges and well rounded tips to wings; relatively long tail. Sharp-shinned Hawk *A. striatus* [147]: small head; narrow wings with wrists thrust slightly forward; squared tail (often notched when folded). **PALEARCTIC** Northern Sparrowhawk *A. nisus* [145]: small head; round-tipped wings; squared tail. Levant Sparrowhawk *A. brevipes* [114]: distinctively pointed wing-tips, rounded tail. Shikra *A. badius* [113]: compact; evenly edged wings; rounded tail.

sticks and twigs, initially 70–90 cm across and 25–30 cm deep but with repeated use in different years growing to 100+ cm across and as much as 50–100 cm deep, lined and edged with greenery, leaves and bark; at 8–30 m in main fork or, less often, on lateral branch of forest or woodland tree; occasionally takes over old nest of buteo or other raptor; has nested on ground in Arctic. Clutch 3–4 (1–6). Incubation 35–38 days. Fledging 35–42 days (males 37–, females 37+); independent at 70–90 days.

**POPULATION** In rough terms, breeding range extends over perhaps one-third each of North America and Asia, and perhaps five-sixths of Europe: a total of over 30 million km<sup>2</sup>. Densities in western and central Europe recorded in four areas at 3–5 pairs/100 km<sup>2</sup>, but in boreal regions of north Sweden found to vary from year to year from 1 pair/100 km<sup>2</sup> to 4.5 pairs/100 km<sup>2</sup> according to food supply, and similarly in Alaska from 0.3 pairs/100 km<sup>2</sup> to 2.7 pairs/100 km<sup>2</sup>. An average of only 1 pair/100 km<sup>2</sup> over the entire range would give world population of 600,000 breeding birds, but there are likely to be at least half as many immature and other non-breeders. In fact, if we take Europe alone, the density is probably higher than this: the most recent individual country estimates available give a total European population of between 145,000 and 161,000 pairs, or a mean density of between 1 pair/60 km<sup>2</sup> and 1 pair/54 km<sup>2</sup>. On this basis, the world population, including non-breeders, may be well into seven figures, particularly as estimates of accipiter breeding populations are found to be on the low side when migration counts are available (e.g. Levant Sparrowhawk [114]). In many parts of range, especially Europe, populations decreased significantly through human persecution (especially shooting), disturbance and loss of habitat throughout the 19th century (and probably earlier) and well into the 20th; and then further sharp declines in the 1950s and 1960s were probably linked with pesticide pollution. Although still persecuted in some areas, and even decreasing in Norway, Iberia and parts of east and southeast Europe, now generally stable in North America and increasing in many countries from Britain (re-established since 1968, partly through falconry escapes, and now over 200 pairs) and France (3,000–4,500 pairs) across central Europe to Russia (estimated 85,000 pairs) and much of former USSR, where helped by plantations and other reafforestation.

**GEOGRAPHICAL VARIATION** Eight or nine races usually recognised, two of them dimorphic.

*A. g. gentilis* (mainland Europe, except northern Fennoscandia and north Russia, south to northwest Africa and east to Urals, Caucasus and Asia Minor) Large; dark slaty-brown above with black-brown head, thin and, towards south of range, increasingly ill-defined white supercilia; creamy below with heavy dark barring, broader and denser in south, and inconspicuous shaft-streaks.

*A. g. arrigonii* (Corsica, Sardinia) Averages smaller, weaker-footed; more black-brown above with blacker head, whiter below but with still broader blacker barring and clearer shaft-streaks.

*A. g. buteoides* (northern Fennoscandia and Siberia east to Lena, wintering south to central Eurasia) Averages larger than *gentilis*, usually blue-grey above

with dusky-grey crown and clearer white supercilia, and white below with finer blackish-brown barring, but dimorphic in Siberia, where c10% more or less all whitish with variable indications of dark streaks above and barring below.

*A. g. albidus* (northeast Siberia and Kamchatka, wintering south to Transbaikalia, north Mongolia and Ussuriland) Large; dimorphic in roughly equal proportions, either pale grey above with much whitish on head and thin sparse barring below, or more or less pure white.

*A. g. schvedowi* (Asiatic steppes from southern Urals east to Amurland, Ussuriland, Manchuria, west-central China and perhaps Sakhalin and Kuriles) Averages smaller, shorter-winged, weaker-footed; slate-grey above with blackish head, densely marked below with thin brown barring.

*A. g. fujiyamae* (Japan) Smaller than *schvedowi*; darker slate above and more strongly barred below.

*A. g. atricapillus* (most North America) Averages slightly smaller than north Palearctic races, and RSD not so great; blue-grey above with contrasting black head and broad white supercilia; greyish below, with fine dark grey wavy barring and clear black shaft-streaks combining into vermiculated effect (but at distance looking almost uniformly grey, except for white undertail-coverts).

*A. g. laingi* (Queen Charlotte Islands, Vancouver Island) Similar, but slightly darker and more heavily barred.

*A. g. apache* (northwest Mexico into southern New Mexico and Arizona) Averages larger, heavier-footed; also darker.

The three American races with their boldly contrasted head and vermiculated underparts form a rather distinct group, but are poorly differentiated from each other: *apache* in particular appears clinal. Juveniles differ less than adults, but in north Palearctic and, especially, America tend to have clearer supercilia and to be more whitish to cream or pale buff below, while other Palearctic races more rufous-buff below, becoming darker rufous in south. Southwest Palearctic populations also sometimes separated into three further races (*gallinarum* in west and central Europe, *kleinschmidti* in Iberia and northwest Africa, *marginatus* in Balkans), but these represent clinal extremes of decreasing size, darker coloration and denser barring from north to south. All differences between intracontinental populations tend to be clinal, most obvious being the increasingly greyer and then paler upperparts and fainter barring below, with higher proportions of whitish or white morphs, towards northeast Asia. In Britain, where became extinct in 19th century, present expanding population derived largely or entirely from escapes and releases since 1960s; now mixture of relatively small dark *gentilis* from central Europe ('*gallinarum*' stock) and larger and paler blue-grey *buteoides* from northern Fennoscandia. Hensl's and Meyer's Goshawks [152, 154] are sometimes considered to form a superspecies with Northern Goshawk (see comment under Hensl's, and also in Wattel).

**MEASUREMENTS** *A. g. gentilis* ♂ wing 300–342 mm, ♀ 336–385 mm; ♂ tail 203–235 mm, ♀ 243–270 mm; ♂ tarsus 68–78 mm, ♀ 78–88 mm. *A. g. arrigonii* ♂ wing

293–308 mm, ♀ 335–347 mm. *A. g. butroides* ♂ wing 308–345 mm, ♀ 340–388 mm. *A. g. albidus* ♂ wing 316–346 mm, ♀ 370–388 mm. *A. g. schvedowi* ♂ wing 298–323 mm, ♀ 330–362 mm. *A. g. fujiyamae* ♂ wing 286–300 mm, ♀ 302–350 mm. *A. g. atricapillus* ♂ wing 308–337 mm, ♀ 324–359 mm. *A. g. laingi* ♂ wing 312 mm (one), ♀ 332 mm (one). *A. g. apache* ♂ wing 344–354 mm, ♀ 365–390 mm. **Weights** *A. g. gentilis* ♂ 517 g–1.11 kg, ♀ 820 g–2.2 kg. *A. g. butroides* ♂ 870 g–1.17 kg, ♀ 1.19–1.85 kg; *A. g. albidus* ♂ 894 g–1.2 kg, ♀ 1.3–1.4 kg (two). *A. g. schvedowi* ♂ 556–600 g (two), ♀ 1 kg (one). *A. g. atricapillus* ♂ 677 g–1.01 kg, ♀ 758 g–1.21 kg.

**REFERENCES** Ali & Ripley (1978), Beaman & Madge (1998), Bergier (1987), Bergman (1961), Bijlsma (1991), Brazil (1991), Brown *et al.* (1982), Brüll (1964), Clark & Wheelert (1987), Craighead & Craighead (1956), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Dietzen (1978), Dobler (1990), Fischer (1983a), Flint *et al.* (1984), Forsman (1999), Génsbol (1986, 1995), Glutz von Blotsheim *et al.* (1971), Goszczyński & Pilatowski (1986), Hagemeyer & Blair (1997),

Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1983), Haukioja & Haukioja (1970), Henny *et al.* (1985), Höglund (1964a/b), Holsten (1942), Howell & Webb (1995), Johnsgard (1990), Kennedy (1987), Kenward (1977, 1978, 1981, 1982), Kenward & Lindsay (1981), Kenward *et al.* (1981, 1993), Kimberly & Mosher (1981), Kjellen (1982), Kostrzewa (1987, 1991), Kostrzewa & Kostrzewa (1990, 1991), Kramer (1973, 1995), Lindén & Wikman (1983), Looft (1981), McGowan (1975), Mañosa (1994), Marström & Kenward (1981, 1991), Marquis & Newton (1982b), Möller (1987), Moore & Henny (1983), Mueller & Berger (1967b, 1968), Mueller *et al.* (1976, 1977), Oplam (1975), Oplam *et al.* (1977), Palmer (1988), Petty (1989), Rasmussen & Storgård (1989), Reynolds & Meslow (1984), Reynolds & Wight (1978), Reynolds *et al.* (1982), Rust (1971), Schnell (1958), Snow & Perrins (1998), Snyder & Wiley (1976), Speiser & Bosakowski (1984, 1989, 1991), Storer (1954, 1966), Sulkava (1964b), Sulkava *et al.* (1994), Thiollay (1967a), Tinbergen (1936a/b, 1946), Utendörfer (1952), van Beusekom (1972), Wattel (1973), Whaley & White (1994), Wheelert & Clark (1995), Widén (1984, 1985, 1987, 1989), Wikman (1975), Wyroll (1977).

## 154 MEYER'S GOSHAWK

*Accipiter meyerianus* (Sharpe, 1878)

Plate 46

Other name: Papuan Goshawk

**DISTRIBUTION** Northern Australasian (3°N to 11°S); order 4?; inadequately known, but apparently rare or scarce to, at best, locally or seasonally not uncommon. New Guinea and various smaller islands from Moluccas to Solomons: in New Guinea, probably at least patchily in mountains from northwest Irian Jaya to Owen Stanley Range in southeast Papua (but seldom in lowlands); in Moluccas, on largest two islands of Halmahera and Seram and otherwise only on Boano and Seram Laut (both near Seram); off north Irian Jaya, only on Yapen (not even adjacent Biak vet), Karkar and Bagabag; in Bismarck Archipelago, only on Umboi, New Britain, Watom and apparently Manus; and, in Solomons, only on Kolombangara, Nggatokae and Guadalcanal.

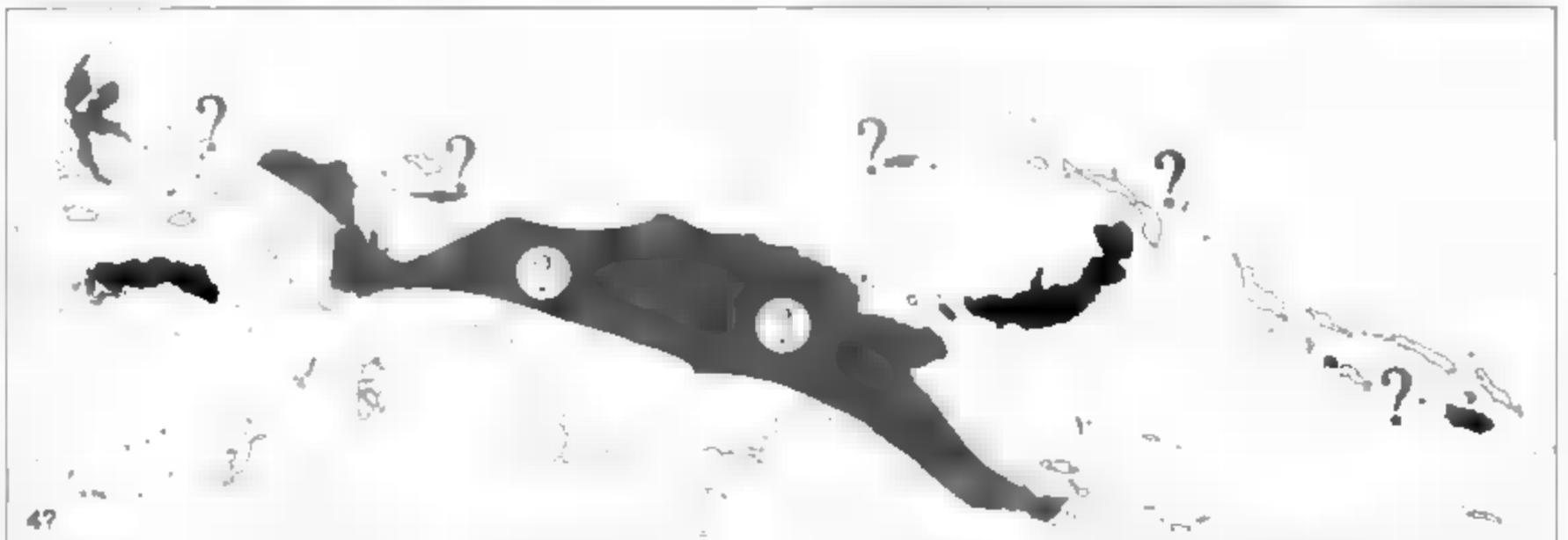
**MOVEMENTS** Possibly sedentary to some extent, but perhaps also partial or local migrant; patchy distribution suggests species either easily overlooked or nomadic. For example, may be mainly dry-season visitor to northeast New Britain (see Wattel) and such records as that from Watom Island seem likely to relate to wanderers.

Indeed, since this species appears to be mainly montane in New Guinea, it may be that many lowland records come into nomadic category (see Habitat).

**HABITAT** Forest and forest edge at various levels, evidently also hunting over partly cleared areas, native gardens, and other broken country. In Seram, adult with fledged young in lowland forest; on Umboi, pair established at 500 m. Observations on smaller islands often at low altitudes, but in New Guinea, although occasionally noted down to sea-level, perhaps mainly hill and mountain forest above 1,200 m (possibly through competition with Bürgers's Hawk [155]?). In all, sea-level to 2,700 m.

**FIELD CHARACTERS** Large to very large accipiter, black and white or all black as adult, with prominent head, heavy bill, short sturdy legs and toes, relatively long rounded wings and comparatively short tail. Not particularly secretive and some individuals frequently seen perched, but said to be active in early morning and to spend much of day in cover. Dimorphic. Sexes very similar, but female 1–18% larger; juvenile distinct.

**PERCHED** Normal adult Pied morph all black or very



## Accipitridae (o: hawks of uncertain position)

### 155 BÜRGER'S HAWK

*Erythrotriorchis buergeri* (Reichenow, 1914)

Plate 44

Other names: Chestnut-shouldered Goshawk, Bürger's (or, wrongly, Bürger's) Goshawk or Sparrowhawk

**DISTRIBUTION** Northern Australasian (2°S to 10°S); order 3-4; little known, but evidently scarce to rare and local. Endemic to New Guinea: at least in northern Irian Jaya (Pegunungan Van Rees) and east and southeast of mainland Papua (Central and Bismarck Ranges south to Owen Stanley Range).



**MOVEMENTS** Perhaps sedentary, but no information.

**HABITAT** Hill and lower mountain forest, often less high than Meyer's Goshawk [154] and, to judge from comparable wing shape, probably similarly hunting over broken country. About 450 m, and possibly lower, to 1,600 m.

**FIELD CHARACTERS** Large hawk, generally black, rufous and white as adult, with prominent head, short occipital crest, short sturdy legs and long toes. Often treated as accipiter but, with Red Hawk [156], now increasingly regarded as generically distinct and possibly quite unrelated. Field observation limited, but recorded feeding inside canopy; rather long wings extend up to half down medium-length tail. Dimorphic (but only one melanistic specimen known). Sexes similar, but female 7-15% larger; juvenile very distinct, and apparently moults into separate immature stage more like adult, but still with extensive chestnut-rufous coloration until at least second year.

**PERCHED Adult** Slightly glossy black above with solidly black crown to below eyes, often some white bases showing through on nape, variable but fairly narrow rufous edges on back, rump and scapulars, and much broader rufous edges on wing-coverts, these last forming large black-mottled chestnut shoulder-patches (though in worn plumage even they can become predominantly black); tail with narrow whitish tip and 8-10 thin and rather obscure pale brown bars; white below, boldly marked with black in form of thin shaft-streaks on throat and cheeks, broad streaks on breast, bold drops and hearts on abdomen, broad bars on flanks, and thin rufous-edged bars or spots on thighs. **Melanistic adult**

Entirely black (though conceivably could have tail barred above like adult, or white bases showing through on nape, though neither visible on single specimen), apart from undersides of wings and tail which would normally be visible only in flight (see below). **Juvenile** Wing-coverts much as adult, but these rufous shoulders do not stand out because entire plumage predominantly rufous: above, dull blackish feathers all have broad rufous edges, and flight-feathers and tail more obvious rufous bars; whole head also largely rufous, with black streaking strongest on nape and neck-sides; all rufous below, with sparse blackish streaks, apart from paler undertail-coverts and whitish throat. (Melanistic juvenile undescribed, but likely to be as dark as adult.) **Bare parts** Adult eyes yellow, juvenile pale brownish, becoming greenish-yellow. Adult cere and legs greenish-yellow, juvenile probably greener.

**FLIGHT** Largish raptor with protruding head, long and fairly broad wings with somewhat rounded tips, and moderately long tail (though short by accipiter standards); wingspan 2.0 times total length. Only published reference to flight involved both soaring and sustained flapping, but may have related to display. **Adult** Largely black above except for usually obvious rufous shoulders and variable but less conspicuous rufous edges on back, scapulars and rump; tail obscurely and narrowly barred with grey; below, white body and wing-linings boldly marked with black streaks, spots and bars, wing-linings being broadly barred much like flanks; undersides of flight-feathers and tail dusky-grey with many narrow but obvious whitish bars. **Melanistic adult** All black, including much of wing-linings, except that, on underside, dark grey greater wing-coverts form paler mid-wing band while dusky-grey flight-feathers and tail show light grey bars, even narrower than those of normal plumage (see fig. 38 on p. 543). **Juvenile** Looks predominantly rich rufous, fairly sparsely streaked with black, apart from whiter throat and undertail-coverts and obviously pale-banded flight-feathers and tail: all these quills are blackish above, barred rufous, and dark grey below with pale bars much like adult.

**CONFUSION SPECIES** Normal adult almost unmistakable on various combinations of size, shape and pattern, particularly if rufous shoulders visible; but, in flight from underneath, needs to be distinguished from Long-tailed Honey-buzzard [16], which has much finer streaking below and only three broad pale bands on flight-feathers and tail, apart from being larger (with some overlap) and differently shaped. Melanistic adult hard to distinguish from black morph of Meyer's Goshawk [154], though that has dark red eyes, fewer and wider pale bands on tail (or tail may be uniformly dark), and diffuse and obscure barring on flight-feathers, as well as rounder crown and, if photographed, five-fingered (not six-fingered) wings. Longer-tailed Doria's Hawk [157] is profusely pale-banded above and far more

sparsely streaked below, adult with dark mask as well. Normal juvenile Bùrgers's (which has obvious affinities with juvenile Red Hawk [156] of Australia) could also be confused only with juvenile Meyer's, though that is far less rufous, with much narrower edges above and more rufous-buff or cinnamon underparts very thinly streaked, as well as having more broadly banded and browner tail.

**VOICE** Big high nasal upslurs at c1 per second, slower than Meyer's Goshawk [154] and with distinctive forced quality (Diamond).

**FOOD** Little known. Only records relate to birds, and species usually stated to be primarily a bird-eater, but relatively small degree of RSD perhaps suggests that forest mammals and reptiles may also be regular prey. Diamond classed this species as forager of 'soaring goshawk' type. One seen to make direct flying attack from tree perch on ridge at distant prey in forest.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No descriptions of aerial displays other than 'soaring,

circling, or flapping somewhat above the forest canopy while calling loudly' (Diamond).

**BREEDING** No information. One full-grown but dependent juvenile emitting begging calls in October.

**POPULATION** No data on densities, though species generally considered rare and so order of magnitude here tentatively put at only hundreds. Nevertheless, existing pattern of records suggests that limits of distribution may enclose quarter of New Guinea, or about 200,000 km<sup>2</sup>, in which case population could be in four figures. Widespread deforestation would clearly be serious threat.

**GEOGRAPHICAL VARIATION** Monotypic. Black morph apparently very rare.

**MEASUREMENTS** ♂ wing 288–301 mm, ♀ 321–330 mm; ♂ tail 194–215 mm, ♀ 229–236 mm; ♂♀ tarsus 70–78 mm. **Weights** ♂ 575 g (one).

**REFERENCES** Beehler (1978), Beehler *et al.* (1986), Coates (1985), Debus & Edelstam (1994), Debus *et al.* (1994), Diamond (1972, 1985, 1986), Rand & Gilliard (1967), Schodde (1993), Watel (1975).

## 156 RED HAWK

*Erythrotriorchis radiatus* (Latham 1801)

Plate 48

Other name: Red Goshawk

**DISTRIBUTION** Australasian (historically 11°S to 34°S, now only to 28°S and mainly north of 19°S); order 3–4; locally common, but mostly scarce to rare, and classified as vulnerable; endangered to virtually extinct in south-east of range. Endemic to north and east (also now, apparently, central) Australia: mainly within 200 km of coast, from Kimberley region in north Western Australia through northern section of Northern Territory and northern and eastern parts of Queensland, south formerly to northeast New South Wales (but now virtually extinct there, and endangered in southeast Queensland); also 'there have recently also been several reliable reports from central Australia' (BirdLife International).



**MOVEMENTS** Most adults considered to be largely or entirely sedentary, apparently remaining all year within 6–15 km of nest. Some extend their home ranges from higher ground to coastal plains in eastern Queensland during the austral winter. Also local movements in times

of drought, for example appearing in rainforest in the Atherton area, Queensland, only during dry conditions to north and west. Juveniles more dispersive: a few records several hundred kilometres outside breeding range.

**HABITAT** More or less tall open forest, eucalyptus woodland, gallery forest along watercourses, swamp sclerophyll forest, and wooded rivers in tropical savannah, almost entirely in coastal and subcoastal areas. Wandering juveniles sometimes also in denser rainforest, mangrove or low open woodland and even around open floodplains or agricultural land. Sea-level to 1,000 m.

**FIELD CHARACTERS** Large, robust hawk (deep-billed female similar in size to small eagle), largely rufous and dark brown as adult, with prominent flat head, slight occipital crest and facial ruff, powerful shoulders, thick legs and massive long-toed feet. Perches very upright, often secretively within canopy but sometimes on exposed branch; long wings extend well down longish squared tail. Formerly treated as accipiter but, like Bùrgers's Hawk [155], now regarded as generically distinct and perhaps quite unrelated; more likely to be confused, in differing circumstances, with falcons, kites and harriers (see below) than with accipiters (which readily distinguished by size and proportions, including short wings covering only base of tail). Sexes broadly similar in plumage, if readily separable: female 3–23% larger, much more thickset (heavier, it seems, by as much as 75%) and more aquiline, with deeper and clearly longer bill and thicker legs, than relatively slight male; juvenile distinguishable but, as yellowing of eyes and lessening of rufous on underparts appear to progress over several years, it appears that there are probably at least two moults into distinct immature age-classes before full adult plumage attained. (Until late 1980s, almost all published descriptions treated brighter juvenile as adult, and vice versa.)

forward before rising vertically, whereupon female also rose (the two possibly touched talons) and both regained initial altitudes and flight paths to repeat display, with male approaching from opposite direction; total of six approaches made, then both soared up, male slightly above and behind female, and engaged in fast parallel chase. Male may also fly acrobatically through and below canopy, twisting and swerving, sideslipping, bouncing off branches, climbing and diving, sometimes circling perched female or collecting sticks or swooping to nest; and, if perching near female, he may bow deeply and twist and bob head. One or both of pair sometimes also stay on high exposed perches for hour or more, or make short flights and jumps between branches in and around nest-tree.

**BREEDING** May–December; laying probably earliest in north, sometimes in May, while farther south most eggs mid July–mid September (though courtship can begin late March and nest-building late May). Relatively small neat nest of sticks and twigs, 40–120 cm across and 30–50 cm deep, lined with green leaves, at 9–29 m in substantial exposed fork close to top of mature eucalyptus or other tree (usually tallest tree in tall stand), often by river and invariably within 1 km of water. Clutch 1–2. Incubation 39–43 days. Fledging 51–53 days for males, probably slightly longer for females, with dependence for 10–11+ weeks.

**POPULATION** Limits of range enclose at least 750,000 km<sup>2</sup> (and possibly over 1 million km<sup>2</sup>), but nests depend on proximity of permanent water and much intervening habitat is unsuitable; other former sites have been cleared for agriculture. Apparently little change in total distribution since European settlement, but many local and often serious declines; in particular, probably as result of widespread deforestation, range has contracted northwards and breeding become much rarer in south-east Queensland and, especially, New South Wales (formerly south to Sydney area and c34°S, where 70–90% of habitat has been cleared). Even in optimum areas,

nests are at least 6–22 km apart, while home ranges have been estimated at 50–220 km<sup>2</sup>; in one case, female ranged over 120 km<sup>2</sup> and male at least 200 km<sup>2</sup>. Thus, densities generally very low and breeding total of about 350 pairs was thought likely in early 1990s (Aumann & Baker-Gabb), whereas 'recent surveys suggest breeding is continuous across northern Australia...and [the species] is now known to be particularly common on Melville and Bathurst Islands', both north of Darwin; currently, the 'population is thought to be stable' at around 1,000 individuals (BirdLife International). Because of the small numbers, which may or may not be declining, the species is classified as vulnerable. Threats include habitat loss through tree clearance, and habitat damage through overgrazing, but species can cope with moderate disturbance, and breeding success not necessarily affected by widespread annual burning in tropical Australia. There is little direct persecution, apart from egg-collecting, which, in some areas at least, is serious problem.

**GEOGRAPHICAL VARIATION** Monotypic, though largest birds in south of range and the single recorded southern weight (1.37 kg) is by far the heaviest. Northwestern '*rufotibia*' (once regarded as full species) symptomatic of individual and age variation.

**MEASUREMENTS** ♂ wing 335–372 mm, ♀ 385–424 mm; ♂ tail 194–222 mm, ♀ 221–268 mm; ♂ tarsus 74–82 mm, ♀ 81–93 mm. **Weights** ♂ 630–640 g (two), ♀ 1.1–1.3 kg (two).

**REFERENCES** Andrew (1991), Aumann & Baker-Gabb (1991), BirdLife International (2000), Blakers *et al.* (1984), Brckhill (1991), Brower & Garnett (1990), Collar & Andrew (1988), Condon & Amadon (1954), Copper & Copper (1981), Czechura & Czechura (1994), Debus (1991c, 1993b), Debus & Czechura (1988a, b), Debus *et al.* (1993a, b), Favaroni (1981), Garnett (1992), Hertog (1986), Hollands (1984), Hughes & Hughes (1988), Lord (1952), Marchant & Higgins (1993), Olsen (1991), Olsen & Marples (1993), Olsen *et al.* (1993), Scholde (1993), Smith (1991)

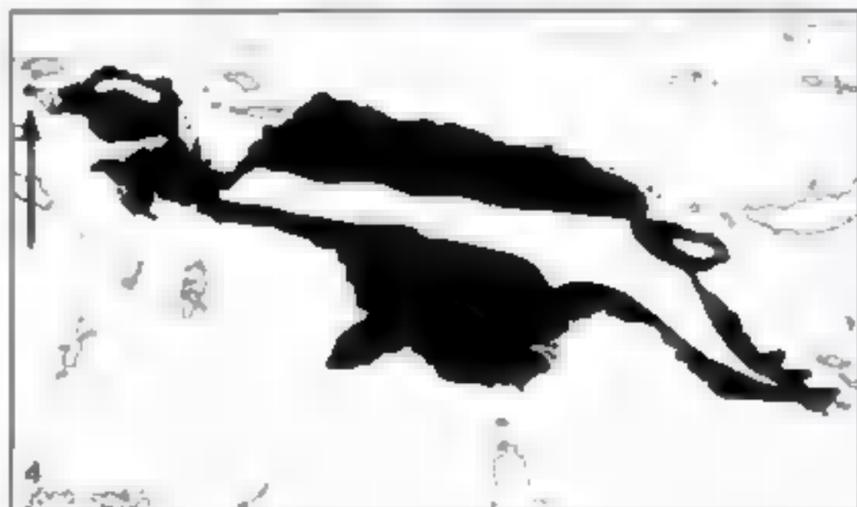
## 157 DORIA'S HAWK

*Megatriorchis doriae* Salvadori & D'Albertis, 1875

Plate 44

Other name: Doria's Goshawk

**DISTRIBUTION** Australasian (0° to 11°S); order 4; widely but thinly distributed, generally regarded as uncommon but unobtrusive and easily overlooked. New Guinea: long regarded as endemic to the mainland,



where local throughout lowlands of both Irian Jaya and Papua, but in 1980s found also on Batanta Island off northwest corner.

**MOVEMENTS** Adults assumed to be sedentary, juveniles perhaps more dispersive.

**HABITAT** Lower canopy of rainforest, occasionally mangroves, also secondary growth in disturbed or partly cleared areas. Mainly sea-level to 1,100 m, sometimes to 1,400 m, very locally to 1,650 m.

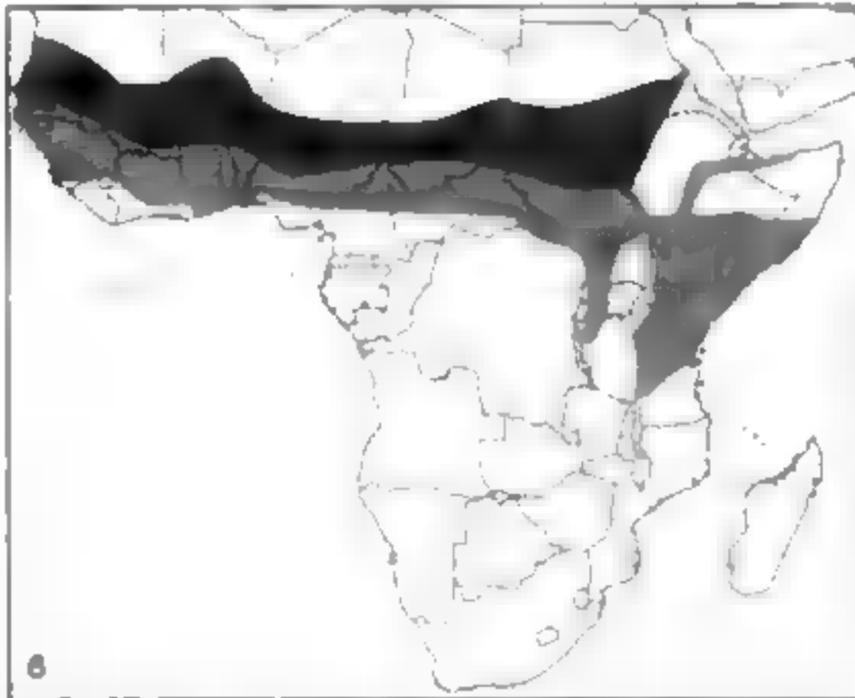
**FIELD CHARACTERS** Largish, slender-looking hawk, clearly barred above and pale below, with heavy bill but small head, slight occipital crest and suggestion of facial ruff, long thick legs and powerful long-toed feet. Though sometimes likened to large long-tailed goshawk, described as 'kite-like in appearance and tall, sluggish in habits, tame in composition' (Finch). Perches very upright beneath canopy but, though inconspicuous, not secretive

## 159 GRASSHOPPER BUZZARD-HAWK *Butastur rufipennis* (Sundevall, 1851)

Plate 52

Other name: Grasshopper Buzzard

**DISTRIBUTION** Afrotropical (18°N to 8°S, breeding mainly 9–15°N and non-breeding south of 9°N); order 6; locally common to abundant, more numerous in west, probably decreasing in east. Endemic to tropical Africa: breeds in sub-Saharan belt less than 650 km wide from Senegambia and Guinea, through northern Nigeria and Cameroon, and southern Niger and Chad, to central Sudan, northern Ethiopia and northwest Somalia.



**MOVEMENTS** Intratropical north-south migrant, but moves only relatively short distances related to rains and dry seasons and, except in East Africa, stays well north of equator. After breeding during rains, whole population wanders south into mainly even narrower belt from Liberia and central Ivory Coast, Ghana and Nigeria across to southernmost Sudan and Ethiopia, but in East Africa extending farther south to northwest Uganda, east Kenya, southern Somalia and northeast Tanzania (arriving there in wet season). Maximum distances travelled cannot be more than 1,200 km in West Africa and 2,500 km in East, and many probably move little more than 500–750 km. Breeds mainly March–September and moves south chiefly October–February, but timing varies regionally: for example, species chiefly present in Senegambia during June–December and in Kenya and Tanzania during November–March (October–April). Southward progress often slow in face of dry-season grass fires (see Food) and many birds nomadic when not breeding, so numbers in any area differ greatly from year to year.

**HABITAT** Varies from arid thornbush, even subdesert scrub, and bushed grassland to savannah, wooded grassland, cultivation and sometimes forest edge, and even margins of swamps. But mainly dry open country, frequently attending grass fires or recently burnt areas. In West Africa, where commonest, usually moves out at onset of rains or when grass cover becomes too extensive. Sea-level to 1,200+ m.

**FIELD CHARACTERS** Mid-sized hawk, as adult largely grey-brown, buff-rufous and creamy, slim and somewhat kite-like, usually treated as buteonine but, like its three congeners [160–162], not particularly 'buzzard'-like and

of unclear relationship; weak bill, small head, relatively long legs but short toes, long wings, medium-length tail. Somewhat sluggish, spending long periods on any one of same two or three perches day after day; particularly favours low bare trees, dead branches and telegraph poles, either standing upright or sometimes crouching rather flatly; long wings reach almost to tip of tail. At all ages, soon recognised by slender tapering shape and strip of rufous along outer part of folded wings. Sexes similar, but female averages 7% larger and 9% heavier; juvenile not dissimilar but distinct; presumably moults direct into adult plumage, but timing unclear.

**PERCHED Adult** Grey-brown above, with fine dark streaks and rufous edges on mantle and shoulders, and buff to rufous below, streaked dark on breast; apart from reddish panel on closed wings, most distinctive features are darker grey-brown head, paler cream throat bordered with blackish moustaches and divided by median stripe, and mainly yellow bill. **Juvenile** Quite similar but paler; in particular, streaky head much paler and more rufous, with diffuse moustaches and less yellow bill, greyer upperparts with broader rufous edges, plain tail but for dark subterminal band, and more uniform breast with fewer, finer streaks. **Bare parts** Adult eyes pale yellow, juvenile brown. Adult cere and bill-base yellow, juvenile more greenish-yellow and less extensive. Legs pale yellow. **FLIGHT** Smallish to mid-sized raptor with small head, tail longer than wing-base, wings long and rather pointed; wingspan 2.4 times total length. Usually flies quite low, with series of fast flaps interspersed with buoyant glides on flattish wings, before swooping up to next perch. At all ages, outer halves of wings distinctively reddish above and broadly outlined in black. **Adult** Looks streaky grey-brown above with darker head and white-tipped tail obscurely barred; below, median throat-stripe, streaked breast, usually whiter but more heavily streaked wing-linings, pale rufous primaries and barred greyish secondaries with broad black trailing edges, and dark-banded grey tail. **Juvenile** Similar but paler, with lighter head, plainer grey central tail (dark subterminal band, otherwise barred only at sides), and less streaked underbody and wing-linings.

**CONFUSION SPECIES** Shape, behaviour and black-edged rufous outer wings distinctive. Unlikely to be misidentified if seen clearly, whether perched or flying.

**VOICE** Silent except in breeding season, when becomes noisy. Main call loud chattering *ki-ki-ki-kee*.

**FOOD** Primarily insects, also spiders, millipedes and, locally, crabs; few small birds, mammals and reptiles, some at least of which may have been killed or injured by fire. Favours grasshoppers, locusts and mantids, but takes many alate termites and ants, also beetles, stick insects. Most prey caught on ground, partly by still-hunting from low or higher perch (usually 3–8 m) and partly by foraging on foot, especially after grass fires or when swarms of potential prey available. Also hawks insects on wing. Accompanies flocks of Cattle Egrets *Butor ibis* or herds of large mammals, taking insects flushed by them.

**SOCIOSEXUAL BEHAVIOUR** In single pairs when

breeding, but otherwise often gregarious both on migration and during dry season, sometimes in loose congregations of 50–100 or more near grass fires. In aerial courtship, pairs soar and circle together calling, and various acrobatics include spectacular diving, side-slipping and tumbling, during at least some of which the rufous wings flash, but displays hardly studied.

**BREEDING** Little known, but likely March–August. Nest is solid deep structure of sticks, c.35 cm across and up to 40 cm deep, lined with green leaves (unlike otherwise rather similar nest of Black Kite [39]), sometimes at 10–12 m, but usually much lower in small tree. Clutch 1–3. Incubation and fledging periods not known.

**POPULATION** No data on densities. Generally common enough, but much less numerous now as non-breeding migrant to Kenya and north Tanzania, which perhaps suggests significant decline in eastern part of breeding range (southern Sudan and Ethiopia?). Locally

abundant in West Africa in dry season, where the second commonest raptor after Black Kite [39]. Possibly vulnerable to overgrazing and drought in Sahel, but nomadic behaviour enables it to take advantage of local changes in prey availability.

**GEOGRAPHICAL VARIATION** Monotypic. Forms a superspecies with Rufous-winged, White-edged and Grey-faced Buzzard-hawks [160–162] of southern and eastern Asia.

**MEASUREMENTS** ♂ wing 274–311 mm, ♀ 295–330 mm; ♂ tail 160–175 mm, ♀ 172–182 mm; ♂ tarsus 55–58 mm, ♀ 57–61 mm. **Weights** ♂ 310–342 g, ♀ 300–408 g.

**REFERENCES** Bannerman (1955), Britton (1980), Brown *et al.* (1982), Chapin (1952), Gore (1990), Grimes (1987), Kemp & Kemp (1998), Lewis & Pomero (1989), Mackworth-Pratt & Grant (1957–73), Rasa (1987), Thiollay (1975a/b/c, 1976a/b, 1977b/c, 1978a/c, 1985d), Thiollay & Clibert (1990), Zimmerman *et al.* (1996).

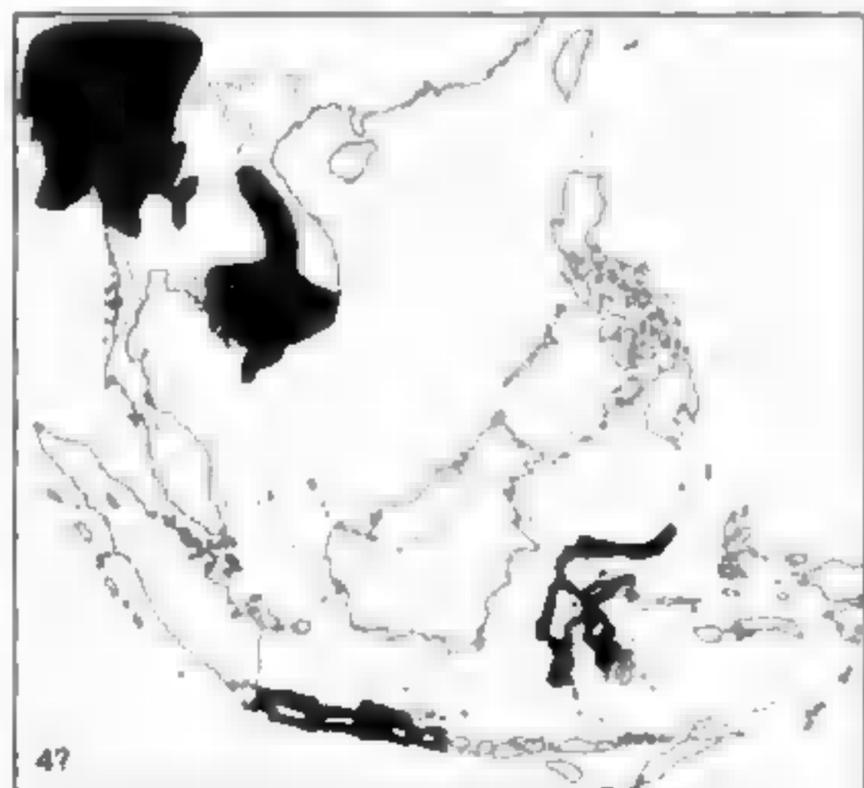
## 160 RUFIOUS-WINGED BUZZARD-HAWK

### *Butastur liventer* (Temminck, 1827)

Plate 53

Other names: Rufous-winged Buzzard-eagle, Cinnamon-winged Buzzard

**DISTRIBUTION** Indomalayan (23°N to 8°S); order 47; mostly uncommon to rare, perhaps still locally more numerous. Southeast Asia and, disjunctly, some Indonesian islands: eastern Burma, marginally southernmost China (southwest Yunnan), northwest quarter of Thailand, northwest and south Laos, into Cambodia and south Vietnam; otherwise apparently confined to Java (rare) and Sulawesi (once common, now apparently scarce). Single old records in southeast Borneo and Timor doubtful.



**MOVEMENTS** Evidently sedentary.

**HABITAT** Open dry dipterocarp woodland and wooded savannah, often near rivers or marshes, also scrub, rice paddies and general cultivation with some trees, in both lowlands and foothills; formerly even in towns in Sulawesi. Sea-level to 1,500 m, but mainly below 800 m.

**FIELD CHARACTERS** Smallish, slim hawk, mainly grey-brown and rufous, with weak bill, long wings, mid-length squared tail, moderately long legs. Sluggish and variously tame or shy. Perches openly on bare branches, telegraph poles, or posts; wing-tips reach or exceed tail-tip. Sexes similar and much overlap in size, though female averages 4% larger (up to 12%); juvenile also somewhat similar; as adult by second year.

**PERCHED Adult** Head, neck, mantle and breast all brown-grey with fine dark shaft-streaks, apart from small whitish throat; browner back and paler wing-coverts rufous-tinged and, again, shaft-streaked; primary and other outer wing-coverts, primaries, and all except innermost secondaries bright rufous with obvious black tips and slight other barring, together forming distinctive rufous wedge along folded wing; tail also rufous (together with rump and coverts) and showing comparable pattern of blackish subterminal band and two to three thin broken bars; belly and, usually, thighs barred grey-brown and white, fading into plain white crissum. **Juvenile** Broadly similar, also with bright rufous flight-feathers and tail (slightly more barred), but whitish forehead and supercilia as well as whiter throat; rufous-tinged browner head and breast, darker back, and cream-edged wing-coverts all more strongly streaked; more white on thighs. **Bare parts** Adult eyes golden-yellow, juvenile yellow. Adult cere bright yellow to orange-yellow, juvenile yellow. Legs yellow.

**FLIGHT** Smallish, slender and somewhat harrier-like raptor (old name 'buzzard-eagle' gives totally wrong impression, and these are not buteas) with slim protruding head, long narrow wings (rounded-tipped, but often looking quite pointed) and mid-length square-cornered tail; wingspan 2.3 times total length. Accipiter-like action with fast beats and short glides when circling around perches, more laboured when rising from ground, but at other times slow deep beats and long glides on nearly level wings, or sailing with pointed tips backswept; also soars on flat wings. **Adult** Extensively

on narrow and slightly round-tipped wings held almost level. **Adult** Mainly brown above with blacker primary coverts, wing-tips and trailing edges, and only suggestion of more rufous windows in primaries, but grey head, small white nape-patch, conspicuously white-tipped uppertail-coverts, and greyish three-banded tail; below, bold white throat-patch, divided and edged with three dusky stripes, in front of fairly solid red-brown to dark brown chest-band; most of rest of abdomen barred brown and white, except plain white undertail-coverts, and wing-linings also barred but less brown and more white, especially towards carpals; white bases to dark-tipped outer primaries, and rest of flight-feathers pale pinkish-grey and thinly dusky-banded; pale grey tail shows two to three broad blackish bars in middle (basal bar half-hidden, lateral feathers plain). **Juvenile** Similar to adult above, except for streaky brown head (whitish forehead and supercilia, dark cheek-patches, white-streaked nape or collar), more whitish-mottled wing-coverts and rump, and four to five narrower blackish tail-bands; quills below much as adult's, though tail shows three to four central bars, but body and wing-linings white to pale rufous extensively streaked with red-brown, or more barred on flanks and thighs, apart from blackish median stripe on white throat and plain white crissum.

**CONFUSION SPECIES** Distinctive shape, both perched and in flight, shared, in southeastern winter quarters only, with Rufous-winged Buzzard-hawk [160] (strikingly rufous flight-feathers and tail, largely white underwings contrasting with greyer and less barred underbody, juvenile not streaked) and, very marginally in Burma alone, with White-eyed Buzzard-hawk [161] (comparable throat pattern and underparts, but smaller, with rufous tail, more uniformly dark forewings, nearly white eyes). Buteos in general are more thickset, with broader and more rounded wings (though in some cases folded wing-tips do fall near to tail-tip). Buoyant gliding shape of *Buteo* more comparable to honey-buzzard *Pernis* or, despite level wings, harrier *Circus*.

**VOICE** Calls all year, but highly vocal before nesting. Repeated peevish or tremulous two-note whistle variously written as *whick-awee...*, *phk-awee...*, *chit-kwee...*, or *te-oin...*, with second note slightly drawn out and upslurred; or more buteo-like mewing *meo-ow*. Frequently uttered, both from perch and when soaring.

**FOOD** Commonly frogs or lizards, together with large insects, in wet and dry habitats respectively; also small snakes, crabs, rodents. Still-hunts from open perch, often dead tree or telegraph pole, swooping down to ground. Most active in early mornings and evenings.

**SOCIOSEXUAL BEHAVIOUR** Solitary, or often in pairs,

in breeding areas and winter quarters, but highly gregarious on passage: in southern Japan, flocks of hundreds or thousands concentrate at staging-post roosts known locally as 'descent of hawks'. Protracted single or mutual high-circling frequent in breeding season, with constant calling, but no other aerial displays described.

**BREEDING** May–July. Smallish loose nest of sticks, twigs and sometimes sedges, c40–50 cm across, lined with green leaves, grass, conifer needles and bark, at c5–12 m in, usually, conifer or other evergreen. Clutch 2–4. Incubation 28–30 days. Fledging c34–36 days.

**POPULATION** Even in Japan, where several local studies published, little known of population size, but concentrations of 'tens of thousands' at southern tip of Kyushu, Japan, in early October suggest total passage of something equivalent to Great Britain's entire estimated population of 32,000 pairs of Northern Sparrowhawks [145] with their young of the year: both island populations are scattered over similar-sized areas approaching 250,000 km<sup>2</sup>. Some Russian and Manchurian birds evidently also pass through southern Japan via Korea, but most of those seem more likely to travel through China, particularly since this is common migrant, sometimes in large flocks, as far west as Burma-Thailand border (see Movements). The Sino-Russian distribution apparently extends over at least another 1 million km<sup>2</sup> and so, extrapolating from the numbers in Japan, a six-figure grand total seems a safe assumption, even though variously described as rare or seriously declining in Russia. Perhaps relevant that up to 1,000 are shot annually in Taiwan, and many others in Philippines and elsewhere.

**GEOGRAPHICAL VARIATION** Monotypic. Rare dark morph referred to, but apparently undescribed. Forms a superspecies with Grasshopper, Rufous-winged and White-eyed Buzzard-hawks [159–161], though plumage patterns rather different.

**MEASUREMENTS** ♂ wing 313–325 mm, ♀ 322–347 mm; ♂♀ tail 182–200 mm, tarsus 54–65 mm. **Weights** ♂ 375–453 g.

**REFERENCES** Anon (1988), Austin & Kuroda (1955), Beehler *et al.* (1986), Brazil (1991), Brazil & Hanawa (1991), Chang (1980), Cheng Tso-hsin (1987), [Ching *et al.* (1989)], Dementiev & Gladkov (1951), Dickinson *et al.* (1991), Ehimekensibu *et al.* (1989), Eichécopar & Hûc (1978), Flint *et al.* (1984), King *et al.* (1975), Knyshantay (1993), Kojima (1982, 1987), Lekagul & Round (1991), Lin & Lin (1986), Mackinnon & Phillipps (1985), McClure (1974), Medway & Wells (1964, 1976), Meyer de Schauensee (1984), Morishita (1986), Moyer (1957), Severinghaus (1991), Smythies (1981, 1986), Takeda (1989), Udagawa (1953), van Marle & Voous (1946), Vaure (1965), Wells (1999), White & Bruce (1986).

## 163 LIZARD-BUZZARD

*Kaupifalco monogrammicus* (Temminck, 1824)

Plate 52

**DISTRIBUTION** Afrotropical (16°N to 30°S); order 6+; variously local and uncommon, even rare, to very common. Sub-Saharan Africa: Senegambia, southern Mali (rare) and Burkina Faso, through Nigeria and southern Chad (rare) to southern Sudan and extreme west Ethi-

opia, western Uganda and coastal Kenya; thence south through West, Central and limited sections of East Africa to northern areas of Namibia and Botswana and north-eastern South Africa; in East Africa common only in parts of Uganda and coastal lowlands of Kenya and Tanzania.



**MOVEMENTS** Generally considered sedentary, but very variable and often considerable post-breeding, dry season influxes of both adults and immatures noted in northeastern South Africa in some years.

**HABITAT** Especially mature broadleaf woodland with tall grass, as well as other moister habitats with good tree cover, including forest clearings, wooded savannah, cultivation by forest edges, gardens and riverine strips; less often in thornbush, scattered baobabs and other drier woodland. Absent from open grassland and other treeless areas. Mainly in higher-rainfall lowlands, sea-level to 1,000 m, but in parts of East Africa not uncommon to 1,500 m and very locally even to 3,000 m.

**FIELD CHARACTERS** Smallish thickset hawk, grey, white and black in all plumages, with small bill, large head, and longish legs that look short because upper tarsus feathered. Perches very upright, both in dense cover and in full open on dead branches, telegraph poles and posts, where often surprisingly approachable; rather point-tipped wings half down medium-length tail. Sexes similar, but female averages 10% larger and 26–28% heavier; juvenile separable on good view; probably moults direct into adult plumage during second year.

**PERCHED** All plumages Easily identified by grey head, upperparts and chest, and contrasting white throat with black median stripe, white abdomen barred blackish except on crissum, white rump, and white-tipped black tail with single or, rarely, two white bands. **Adult** Plain grey, and whiter on abdomen. **Juvenile** Thinly edged buff above, browner-grey on chest, and more buff on abdomen, with less clear white tail-band. **Bare parts** Adult eyes red-brown, juvenile and second-year pale brown. Adult cere and legs orange-red, juvenile orange-yellow.

**FLIGHT** Small raptor, plump, compact, with rounded head, mid-length pointed wings, squared or only slightly rounded tail; wingspan 2.1 times total length. Mostly seen flying from perch to perch with curiously woodpecker-like undulating flight low over ground, swooping upwards at end; seldom soars. **All plumages** Grey and barred plumage distinctive; combination of white rump and black tail with central white band (or two) diagnostic. Flight-feathers barred below; adult wing-linings white, juvenile more buff and mottled or thinly barred.

**CONFUSION SPECIES** Shape, behaviour and plumage so distinctive that confusion highly unlikely, whether

perched or flying. Combination of grey head, chest and upperparts, white rump, and orange-red cere and legs otherwise found only on chanting-goshawks [104–106] (also perch in open, but much larger, less compact, no median throat-stripe, no white band on graduated and edge-banded tail) and Gabar Goshawk [107] (smaller, though female of comparable size, but secretive, accipiter-shaped with short rounded wings, longer rounded and barred tail, longer thinner legs, again no median throat-stripe).

**VOICE** Noisy early in breeding season and occasionally heard at other times, virtually always from perch and often in thick cover (though Pickford *et al.* refer to chanting while soaring). Main 'song' clear melodious chant, *kleeeo klu-klu-klu-kli-kli-kler*, repeated regularly, that begins with drawn-out whistle, then accelerates and finally fades rather hesitantly. Also loud buteo-like mew, *peee-oo*, more emphatic than first note of chant, at short intervals of c15 seconds. Latter call also used by female when male bringing food.

**FOOD** Chiefly large insects and small reptiles, fewer small mammals (rodents); occasional frogs, birds, arachnids; possibly some carrion. In West Africa grasshoppers, small snakes and lizards most numerous items, but around 10% small mammals, whereas in southern Africa lizards and some small snakes considered main prey and, among remainder, termites also recorded. Essentially still-hunter, using regular series of concealed or, often, very open perches, from which it stares fixedly downwards and then swoops to ground, often in long grass. But also forages on foot on recently burnt ground and presumably at termite warms.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Rarely flies above trees, and no aerial displays described; territorial advertisement and contact between pair-members appear simply to involve regular calling (but see Voice).

**BREEDING** February–May in West Africa, March–June in Sudan, September–November in Gabon, January–May and August–December in double seasons of East Africa, probably any months in DR Congo and in May–March (especially October–December) from Zambia southwards. Nest is usually small solid structure of sticks, but up to 40 cm across, lined with debris, sometimes moss, and in southern Africa beard-lichens or dry grass, but only occasionally green leaves; at 3–25 m, but in West Africa mostly 11–18 m and in southern Africa 6–10 m, in main fork or on lateral branch of wide variety of trees, including introduced eucalyptus and pines. Clutch 2 (1–5). Incubation 33–34 days. Fledging c40 days, with dependence for 30–40 days.

**POPULATION** In ideal habitat in West Africa, where species commonest, mean density of 1 pair/80 ha (= 5 pairs/4 km<sup>2</sup>) recorded, on which basis there might be 2 million pairs in the coastal countries from Senegal to Nigeria, but distribution far from even and large areas unsuitable. Additionally, species much rarer in East, southern and forested Central Africa, so that total population in upper hundreds of thousands perhaps more likely. Generally considered stable; increases where dense forest replaced with patchy cultivation, but disappears if proportion of trees lost too high, and

and buff-tinged); but white or white-streaked forehead, supercilia, cheeks and throat combine into whitish face in all forms; breast and flanks vary from brownish-black to grey-streaked white or mottled buff, and lower abdomen, thighs and crissum more or less barred with corresponding shades (or crissum may be plain buff). **Bare parts** Adult eyes red, juvenile yellow. Adult cere blackish-grey, juvenile blacker. Adult legs orange-red, juvenile orange-yellow.

**FLIGHT** Medium-sized but lightly built raptor with small projecting head, rather long, broad rounded wings with long primaries, and long tail extending one-third beyond toes; wingspan 2.0 times total length. Slow floppy beats make for rather ponderous action, usually four to six flaps followed by glide; glides and soars on level or very slightly raised wings; also circles over forest and adjacent open areas. **Adult** Looks more or less uniform shade of grey or black (or appropriately barred on abdomen and wing-linings, or whole underbody, in closer view), with white tip and two broad white or buff bands on black tail and, diagnostically, curved white band on outer part of wings more obvious from underneath (produced by white blotch on inner web of each black primary); crissum may also be more or less white or buff. **Juvenile** Broadly similar to adult, including tail-bands and diagnostic white wing-arc, but greyer populations more streaked and mottled on chest and flanks, and blackish ones more pale-banded below, both with variably buff crissum; best distinguished by whitish face.

**CONFUSION SPECIES** Shape and behaviour, dark cere combined with orange legs and two white tail-bands, and diagnostic wing-arc in flight, make identification straightforward. Nevertheless, according to location, extensive plumage variability requires at least awareness of any of several other black or grey buteonines with broad rounded wings and white bands on black tail that may be sympatric (though all the following have yellow, orange or red cere). Adult black hawks [176–178] are all black or blackish and, in flight, some have white patch (not long curved arc) at base of primaries, but all are bulkier, with a shorter tail and only one white band. Three of the ten 'white hawks' *Leucopternis* are anomalously dark [165–167], but have orange or yellow cere and lores, bigger head, shorter tail and legs and, mostly, pale-banded or white underwings: Slate-coloured [165] most similar and closest in size (adult has dark underwings but only one tail-band, juvenile sometimes two tail-bands but paler and more patterned underwings). Adult Black and (brownish-grey) Crowned Solitary-eagles [183, 184] are far larger and bulkier, with only one tail-band. Adult Grey Hawk [185] may have two white bands, but otherwise much paler below in flight and tail shorter (moreover, any resemblance in plumage is strongest between its northern race and the southernmost Crane-hawks, but the two do not meet). Adult Zone-tailed Hawk [199], also black but long-winged and short-tailed with two-tone pattern in flight, shows single complete white tail-band only from below. Two dark kites may also be taken into account, though both have obvious deeply hooked upper mandible (for extracting snails) and paddle-shaped wings: juvenile Slender-billed [30] (mainly black with two thin tail-bars, but orange cere and lores, short tail and legs) and dark juvenile and grey adult male of Hook-billed [15] (proportions more similar, but heavy

bill, with yellow or multicoloured face, short legs and, in dark juvenile, contrastingly barred primaries).

**VOICE** Usually silent. Shrill whistle, variously written as *shreeui*, *whewoo* or *kweewur*, or described as low nasal whining; not unlike that of Roadside Hawk [186] but thinner. Advertisement call, mainly at dawn or dusk, is low hollow *how* or *waah-a*, repeated at long intervals from concealed perch. Series of low deep whistles, *woop-woop-whoou whoou whoou*, uttered in 'interactions'.

**FOOD** Very varied, including tree-frogs, geckos and other lizards, small snakes, nestling birds, bats and other small mammals, insects, and spiders. Lizards and snakes may be up to 30 cm long; young birds pulled from tree holes include parrots and woodpeckers; insects include beetles, cicadas and cockroaches. In wooded areas, clambers about at any level from canopy, through middle-storey branches or thickets, to lower trunks, and methodically searches holes and crevices, or clumps of bromeliads, or birds' nests, poking its head in to look and then using one of its double-jointed legs to feel for and extract prey; walks along branches, hops from one to next, clings to rough trunks or lips of holes, and wades among bromeliads, wings partly open and tail spread, even hanging upside-down when necessary. May also drop from tree on to prey on ground. Elsewhere, searches among rocks and in thick ground vegetation, and often reported to forage over open marshland by flapping and gliding like harrier (though this seems to need confirmation). Sometimes hunts prey flushed by fires.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. In aerial display, 'flaps and soars in tight circles, then climbs abruptly and immediately thereafter drops sharply, describing an inverted V' (B&A), or may make sudden brief climb and immediate glide down in course of ordinary travelling flight.

**BREEDING** April–July in Mexico, at least July–October in Venezuela, and at least April–October in Surinam, while nests have also been found in Panama and Surinam in January. Rather small and shallow cup-shaped nest of twigs and vines, lined with finer twigs, plant stalks and green leaves or moss, at 10–15 m or more in tall tree, variably close to trunk, hidden among creepers or epiphytes, or well out on limb. Clutch 2 (1–2). Incubation and fledging periods not recorded.

**POPULATION** No data on densities, but vast range encloses over 13 million km<sup>2</sup>; even though that must include much unsuitable habitat and species is often scarce or local, a six-figure total would require an average density of only 1 pair/250 km<sup>2</sup>.

**GEOGRAPHICAL VARIATION** Very variable in colour saturation and extent of fine barring, less so in size. Six races usually recognised, but much intergradation, especially in northern half of range.

*G. c. coerulescens* (north/east Colombia, Venezuela, Guianas, through Amazonia to east Ecuador, east Peru) Smallest; typically, rather uniform blue-grey apart from black tail with white tip and two bold white bands; sometimes darker, or with obscure whitish or buff barring on thighs, belly and wing-linings, or plain white to creamy crissum.

*G. c. gracilis* (northeast Brazil, south to Bahia) Averages marginally larger; slightly paler above;

abdomen) and wing-linings and primary bases predominantly white with thin dark barring; orange legs.

**CONFUSION SPECIES** Needs to be distinguished from mainly dark kites and buteonines with either one or two white tail-bands. Juvenile similar in size and colour to two-banded juvenile Slender-billed Kite [30], which even has orange cere and legs, and obscurely barred paler flight-feathers below; but, when perched, note deeply hooked bill, pale feather-edges above, and wing-tips near end of short tail; in flight, different action and shape, with paddle-wings and short tail. Dark-morph juvenile Hook-billed Kite [15] may also have two (broader) tail-bands, but has heavy bill, yellow facial skin and feet, rufous-buff edges above, longer tail and, in flight, paddle-wings and broadly barred flight-feathers. Adult dark-morph Hook-billed might be confused with adult Slate-coloured Hawk, but is all black (not blue-slate), with much broader tail-band and three-coloured facial skin, as well as shape differences mentioned. Only other confusable *Leucopternis* is Plumbeous Hawk [166], but that is allopatric, entirely west of Andes. The two inland black hawks [177, 178], each with one broad tail-band, are much larger and blacker, with yellow cere and legs, and quite different juveniles. Same points apply to Black Solitary-eagle [188], but even more so. Although adult Zone-tailed Hawk [199] also black, it is long-winged and short-tailed with two-tone pattern in flight, and shows one complete white tail-band only from below. See also discussion under very different Crane-hawk [164] (dark cere, small head, long tail and legs, always two broad tail-bands).

**VOICE** Only description is loud, piercing downslurred whistle, *whooooo-ooooo*.

**FOOD** Aquatic animals: frogs, crabs, fishes, water-snakes. (Also seen to attack lekking cocks-of-the-rock *Rupicola* and troops of squirrel monkeys *Samiri sciureus*, but neither of these seem likely to be intended prey.) Still-hunts, dropping on to prey at water's edge but not diving directly into water.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No aerial displays described, not even soaring.

**BREEDING** No data.

**POPULATION** Very difficult to estimate, but distribution extends over at least 5 million km<sup>2</sup> and, as species is common in lowland forested streams and swamps, a population of tens of thousands must be likely. Deforestation and drainage must also be long-term threats.

**GEOGRAPHICAL VARIATION** Monotypic. Closely related to Plumbeous Hawk [166], which replaces it west of Andes and with which it forms a superspecies.

**MEASUREMENTS** ♂ wing 263–299 mm, ♀ 282–304 mm; ♂ tail 182–190 mm, ♀ 190–201 mm; ♂♀ tarsus 74–85 mm. **Weights** No data, except for 'thin' ♀ at 1 kg (B&A), which seems highly unlikely and ♀ at 455 g (HBW).

**REFERENCES** Amadon (1982b), Blake (1977), Hilty & Brown (1986), Meyer de Schauensee & Phelps (1978), Remsen & Traylor (1989), Sick (1993), Terborgh (1983), Tostain (1986b), Trail (1987).

## 166 PLUMBEOUS HAWK

*Leucopternis plumbea* Salvin, 1872

Plate 54

**DISTRIBUTION** Neotropical (10°N to 5°S); order 4; apparently rare to uncommon, but little known and probably under-recorded. Southernmost Central and northwest South America: east Panama (east Caribbean slope from Escudo de Veraguas eastwards, but now probably no longer west of Canal Zone, also some isolated records from Pacific slope) and in scattered localities down Pacific side of Andes, in Colombia (southwards from south Córdoba), west Ecuador, and extreme northwest Peru (Tumbes).



**MOVEMENTS** Probably largely sedentary.

**HABITAT** Humid tropical and subtropical forest, mainly in foothills but locally in lowlands and now recorded up to premontane pluvial level in southwest Colombia. Seen chiefly by paths and clearings (probably because

most visible there), especially near streams and lakes. Sea-level to 1,400 m, but perhaps primarily at 200–800 m.

**FIELD CHARACTERS** Small, dark, stocky buteonine with rounded head, medium-length wings and tail, and short legs. Perches in cover or more openly at low or medium levels, in early mornings sometimes on high bare branch; wing-tips one-third down tail. Sexes similar, female averaging only 3% larger; juvenile very similar, but distinguishable.

**PERCHED Adult** All dark bluish-slate, blacker on wings and tail, latter with single white median band (but no white tip); thighs only very obscurely barred with greyish-white; conspicuous orange lores and legs. **Juvenile** Similar, but thighs clearly barred with white and lower breast and abdomen variably mottled with greyish; occasionally second white tail-band. **Bare parts** Adult eyes reddish-orange to red, juvenile browner. Cere, lores and legs orange.

**FLIGHT** Rather small compact raptor with short, broad rounded wings and shortish tail; wingspan 2.1 times total length. No description of flight action, other than generally low through forest; never recorded soaring. **Adult** All dark above except for single white median tail-band, and tail and slightly paler slate-grey body similar from below; but, in sharp contrast, underwings largely white except for dark-tipped primaries and greyish mottling towards tips of secondaries; orange legs. **Juvenile** Similar

above unless second tail-band present; below, more clearly barred thighs, somewhat mottled abdomen, some greyish barring on wing-linings and flight-feathers; again, orange legs.

**CONFUSION SPECIES** See under Slate-coloured Hawk [165] (which replaces this species east of Andes, without any overlap) for discussion of other dark raptors with single or double white tail-bands. Plumbeous Hawk is even smaller and, when perched, perhaps more likely to be confused with Plumbeous Kite [33] (much longer rufous-edged wings exceeding tail-tip, dusky cere, paler grey head and underbody, white tail-bars hidden by plain central feathers). In flight, however, Plumbeous Hawk immediately separable from all others by contrast between white underwings and dark body.

**VOICE** Not described.

**FOOD** Little information, though frogs, crabs, fish and water snakes reported. Behaviour, foot structure and very limited RSD suggest diet likely to be mainly amphibians and reptiles. Probably still-hunts, sitting for

long periods on one perch.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No aerial displays described, not even soaring.

**BREEDING** No data.

**POPULATION** Range confined to narrow strip now less than 2,000 km long and, for most part, only 20–100 km wide. No data on densities, but probably low, and it seems unlikely that the population could exceed the lower end of the four-figure order. Increasing deforestation within its range must be serious threat.

**GEOGRAPHICAL VARIATION** Monotypic. Closely related to Slate-coloured Hawk [165], which replaces it east of Andes and with which it forms a superspecies.

**MEASUREMENTS** ♂ wing 219–259 mm, ♀ 225–248 mm; ♂♀ tail 129–145 mm, tarsus 65–75 mm. **Weights** No data.

**REFERENCES** Amadon (1982b), Blake (1977), Collar & Andrew (1988), Davis (1972), Hilty & Brown (1986), Ridgely (1980), Ridgely & Gwynne (1989), Salaman (1993), Sick (1993), Thiollay (1988), Wetmore (1965).

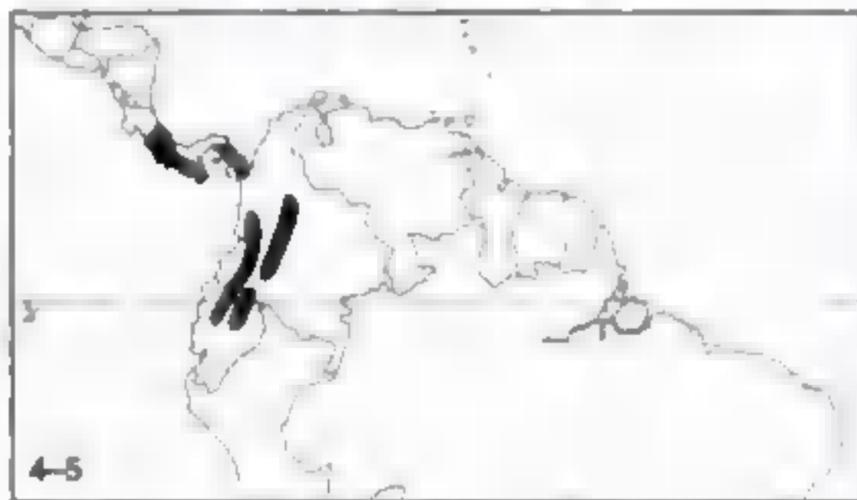
## 167 BARRED HAWK

*Leucopternis princeps* PL Sclater, 1865

Plate 54

Other names: Prince or Prince's Hawk, Black-chested Hawk

**DISTRIBUTION** Neotropical (11°N to 2°S); order 4–5; generally rare to uncommon, locally fairly common. Southern Central America and northwest South America: Costa Rica (whole length on Caribbean slope, east from Cordillera de Talamanca on Pacific), Panama, Colombia (Chocó and Santander southwards, mainly on Pacific slope of Andes and in Magdalena valley, but apparently extending to east slope in south) and north Ecuador (both slopes, though extremely rare).



**MOVEMENTS** Probably fairly sedentary.

**HABITAT** Humid or wet forested tropical and subtropical foothills to lower cloud-forest slopes, especially well-timbered valleys in broken mountainous country; seldom over coastal lowlands. Mostly 500–2,500 m, but locally to 3,000+ m or down to 300 m (occasionally even 50 m on coastal plains in Colombia).

**FIELD CHARACTERS** Largish robust buteonine, mostly blackish above and barred on belly, with snout-like bill giving heavy look to head, mid-length wings, fairly short tail, and relatively long legs. Perches at forest edge or

inside canopy, usually at medium or low levels; wing-tips half down tail. Sexes similar and, though females average 4% larger, smallest are not much bigger than smallest males; juvenile very similar and probably separable only in fresh plumage on close view.

**PERCHED Adult** Whole forebody and upperparts blue-black, edged with slate on head and chest, and variably blotched or mottled with white on scapulars; median white band on upperside of blacker tail, abdomen white with fine black barring (looking evenly greyish at distance); mainly yellow 'snout'. **Juvenile** Very similar, but for thin white edges on nape, mantle, back and wing-coverts (which must be subject to wear); eye colour may differ. **Bare parts** Adult eyes dark blue, juvenile brown to yellow (?). Adult lores, cere and base of bill yellow to orange [juvenile paler yellow?]. Feet yellow.

**FLIGHT** Medium-sized thickset raptor, looking imposing with very broad rounded wings and relatively short tail; wingspan 2.2 times total length. No description of flight action except that, unlike many of its congeners, it commonly soars. **Adult** Above, all dark but for white tail-band and white mottling on scapulars; below, looks mainly greyish-white apart from black head and chest, primary tips, and distal third of tail (abdomen and wing-linings white with fine black barring, greyish flight-feathers obscurely grey-banded and, unexpectedly, basal two-thirds of tail banded grey and white); yellow snout usually conspicuous. **Juvenile** Probably indistinguishable in flight.

**CONFUSION SPECIES** In flight from above, all-dark plumage but for single white median tail-band resembles that of several other but smaller *Leucopternis* [165–171], or comparable-sized black hawks [177, 178], or much larger Black Solitary-eagle [183]. Pattern unique from below, or when perched, but slight possibility of confusion with similarly black-chested and fine-banded (though larger and much longer-winged) Black-chested Eagle-

buzzard [182], which in northwest South America is mostly found well above 2,500 m (though can occur down to 1,600 m): latter differs in greyer tone above, with paler shoulders, plain black tail thinly white-tipped above and below, darker flight-feathers below, yellow bill of normal proportions, and folded wing-tips exceeding tail. See also barred-morph adult Red-backed and Gurney's Hawks [196, 198], which could give similar pattern if variable rufous band missing or hard to see when high overhead. Several more Neotropical raptors are dark-headed, but differ markedly in other ways. Although smaller, Grey-lined Hawk [185] shows rather similar pattern on abdomen, wings and tail from below, but lacks the dark head and chest.

**VOICE** Noisy when soaring: uncertain whether or not this essentially linked with breeding. Loud, far-carrying whistled scream, variously written as *keet*, *kee-aaarr*, *kleryurr* or *wherpoor*, sometimes repeated and accelerating into high, clear laughing *weep weep weep*...

**FOOD** Varied but mostly slow-moving prey, including snakes, lizards, frogs, large insects, crabs, occasionally mammals and birds. Forages both inside forest and by edges and clearings, perching on branches at low or medium heights and dropping down to ground or into undergrowth.

**SOCIOSEXUAL BEHAVIOUR** Although often solitary, two to four birds (adjacent pairs?) not infrequently soar together, especially on sunny mid mornings. Apart from such mutual high-circling with repeated calling, and sailing on part-closed wings, there is a form of sky-dance

that includes looping dives accompanied by series of *weep* calls.

**BREEDING** No details, and nest perhaps never examined. In Costa Rica apparently breeds in dry season, building in mass of epiphytes high in tree.

**POPULATION** Only quantification of density involved six pairs in 100 km<sup>2</sup> in south Colombia, where it is the commonest large hawk; but it is spottily distributed in its Colombian range as a whole, only fairly common in Costa Rica, rare to uncommon in Panama, and extremely rare in Ecuador. On this basis, with total range covering no more than 350,000 km<sup>2</sup>, population may just reach five figures.

**GEOGRAPHICAL VARIATION** Usually treated as monotypic, but birds from south Colombia and north Ecuador are apparently smaller and have been separated as *L. p. zimmeri*. It is not clear whether this population (which also differs in extending to east Andean slope) is isolated or represents the bottom end of a cline of decreasing size.

**MEASUREMENTS** ♂ wing 347–367 mm, ♀ 351–388 mm (*zimmeri* apparently below 358 mm, northern birds usually above 364 mm); ♂ tail 194–223 mm, ♀ 202–227 mm; ♂♀ tarsus 94–104 mm. **Weights** No data, but said to weigh c1 kg.

**REFERENCES** Amadon (1962b), Blake (1977), Davis (1972), Hilt & Brown (1986), Ridgely & Gwynne (1989), Robbins *et al.* (1987), Salaman (1993), Stud (1964), Stiles & Skutch (1989), Thiollay (1988, 1991a), Wetmore (1963).

## 168 BLACK-FACED HAWK

*Leucopternis melanops* (Latham, 1790)

Plate 55

**DISTRIBUTION** Neotropical (8°N to 5°S); order 5; generally considered uncommon to relatively rare, and in west very local, but wide distribution and probably under-recorded. Northern South America in lowlands east of Andes, mainly in northern Amazonia: northeast Ecuador (Napó) and extreme northeast Peru (north Loreto) south Colombia (west Putumayo, west Caquetá), south Venezuela (Amazonas, Bolívar), Guianas, and north Brazil (almost entirely north of Amazon to Amapá and Ilha de Marajó). Records from Rio Tapajós, south of Amazon, have been queried.



**MOVEMENTS** Probably rather sedentary.

**HABITAT** Wet lowland forest, humid secondary growth, riverside thickets, mangroves. Sea-level to 1,000+ m, probably mainly below 500 m except in south Venezuela (Bolívar) and Ecuador (where apparently restricted to forested foot of Sumaco).

**FIELD CHARACTERS** Small white-and-black buteonine with short wings and medium-length tail. Tends to perch in forest undergrowth, thickets and mangroves, often low down, but sometimes quite confiding and will also come out more openly in early mornings; wing-tips cover only base of tail. Sexes similar and, despite considerable overlap, female averages 7% larger (biggest 19% larger than smallest males) and perhaps 15% heavier; juvenile also similar, but distinguishable on good view.

**PERCHED Adult** More white than black: head white with broad black shaft-streaks on crown and hindneck, well-defined black mask, and contrasting orange cere; otherwise slate-black above, mantle and scapulars white-spotted, tail with white median band and thin white tip; underbody all white. **Juvenile** Similar, but white of head and underbody cream-tinged, with thinner black shaft-streaks on crown, hindneck and upper mantle; back and wings thinly edged buff or brown; at least partial second tail-band (sometimes complete). **Bare parts** Eyes grey, brown or brownish-yellow (uncertain whether differences

connected with age). Cere orange to orange-red. Feet orange-yellow.

**FLIGHT** Smallish compact raptor, with short, broad rounded wings and wide tail; wingspan 1.8 times total length. Fast shallow beats and short glides; no description of wing position in gliding; rarely, if ever, soars. **Adult** Mainly black above with white-streaked head and mantle, white-spotted back and scapulars, white central tail-band and tail-tip; mainly white below but for barred ends to flight-feathers and white-banded black tail. **Juvenile** Distinguished by whiter-looking head (creamier, but shaft-streaks less prominent) and by thinner white tail-band with at least traces of second band nearer base.

**CONFUSION SPECIES** Hardly to be confused with any but its congeners, of which only rather larger White Hawk [172] is sympatric (plumage variable, but more white – or, if juvenile, buff – on at least head and tail, and cere grey). Along Amazon eastwards from northeast Peru, care needed to distinguish it from closely related White-browed Hawk [169], which replaces it to south (plainer back, blacker crown and hindneck with white supercilia, streaks extending to chest-sides, greyer tail-base in flight from below); and not far away, but separated by Andes, Semiplumbeous Hawk [171] is also of comparable size and shape (but plain dark slate on hooded head and back). Other black-and-white Neotropical raptors have different proportions and barred tail.

**VOICE** Long, clear, thin whistle.

**FOOD** Recorded prey lizards and large insects; one ate a snake after initially removing the head, and this species may well, like congeners in similar habitats, take other reptiles, frogs and crabs. One also seen to prey on nestling dove. Still-hunts; may also actively forage in mangroves and undergrowth.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No displays described.

**BREEDING** Nest apparently unknown. In Venezuela, male in breeding condition at end April.

**POPULATION** Such a non-soaring forest species is impossible to quantify, but the distributional limits enclose nearly 3.5 million km<sup>2</sup>; even density of only 1 pair/700 km<sup>2</sup> would give five-figure population. Amazonian forest clearance must threaten, but this hawk appears able to adapt to forest patches and secondary growth.

**GEOGRAPHICAL VARIATION** Monotypic. Closely related to White-browed Hawk [169], which replaces it south of Amazon and with which it forms a superspecies.

**MEASUREMENTS** ♂ wing 204–220 mm, ♀ 210–243 mm; ♂♀ tail 129–152 mm, tarsus 57–66 mm. **Weights** ♂ 297–319 g, ♀ 329–380 g.

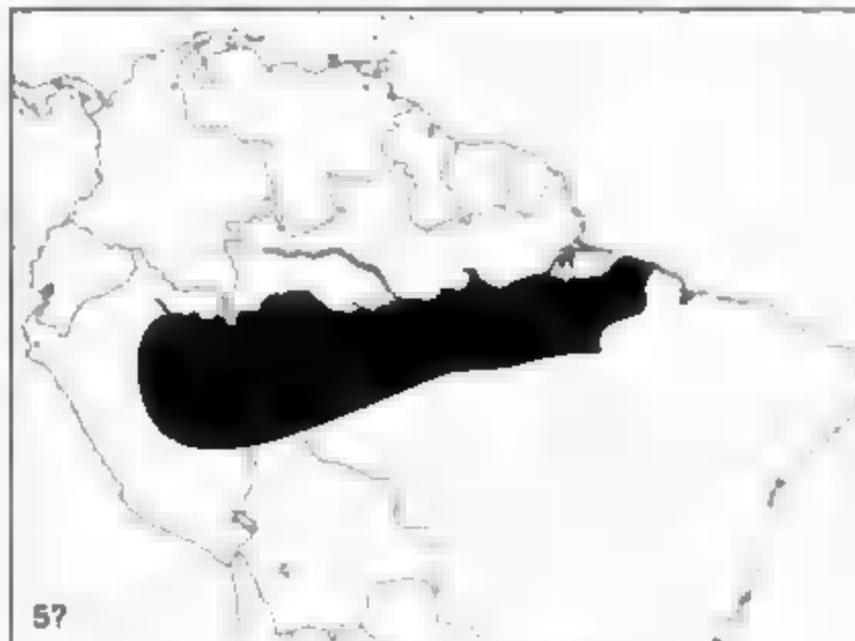
**REFERENCES** Amadon (1964, 1982b), Blake (1977), Friedmann (1948), Haverschmidt (1957, 1968), Hilty & Brown (1986), Meyburg (1986), Meyer de Schauensee & Phelps (1978), Sick (1993), Smolker (1961), Snyder (1966), Thiollay (1989a).

## 169 WHITE-BROWED HAWK

*Leucopternis kuhli* Bonaparte, 1850

Plate 55

**DISTRIBUTION** Neotropical (0° to 12°S); order 5; even less well known than most of its congeners, but wide distribution and probably under-recorded. Southern Amazonia from eastern Peru (central Loreto to Madre de Dios) and extreme north Bolivia (Pando) through north-central Brazil (south of Amazon to eastern Pará).



**MOVEMENTS** Probably largely sedentary.

**HABITAT** Wet lowland forest. Sea-level to 500 m.

**FIELD CHARACTERS** Small black-and-white hawconine, very like related Black-faced Hawk [168] in size and

shape, and probably in stance and behaviour. Sexes similar, but apparently greater RSD than Black-faced, female averaging 11% larger with little overlap; juvenile also similar, but evidently distinguishable on at least tail pattern. **PERCHED Adult** Mainly black above, sparingly white-speckled from crown to upper mantle (most on hindneck), with thin white supercilia above black mask, orange cere; tail with white median band and thin white tip; underbody white, but lower cheeks and chest-sides black-streaked. **Juvenile** Similar (perhaps thinly edged brown or buff above, and more cream-tinged below?), but said to have two or three thin white tail-bands. **Bare parts** Eyes yellow (all ages?). Cere orange. Feet yellow. **FLIGHT** Smallish compact raptor, with short, broad rounded wings and wide tail; wingspan nearly twice total length. No descriptions of flight, but perhaps similar to that of Black-faced Hawk [168]; rarely, if ever, soars. **Adult** Mainly black above with white central tail-band and tail-tip; all white below but for streaking at chest-sides, barred ends to flight-feathers, and greyish base behind white band on black-ended tail. **Juvenile** Similar, but apparently two or three thin white tail-bands.

**CONFUSION SPECIES** See discussion under closely related Black-faced Hawk [168] (dark-streaked white head with more obvious black mask, white-spotted back and scapulars, no streaks at chest-sides, blacker tail-base in flight from below), which replaces this one to north of Amazon eastwards from northeast Peru.

**VOICE** Not described.

**FOOD** Only a snake and a lizard recorded but, like congeners, probably also takes frogs and large insects. Said to hunt near floor of forest. (Compare related Black-faced Hawk [168] for likely feeding behaviour.)

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No displays described.

**BREEDING** No information.

**POPULATION** Range covers nearly 2 million km<sup>2</sup>.

density of only 1 pair/400 km<sup>2</sup> would give five-figure population (cf. Black-faced Hawk [168]).

**GEOGRAPHICAL VARIATION** Monotypic. Closely related to Black-faced Hawk [168], which replaces it north of Amazon and with which it forms a superspecies.

**MEASUREMENTS** ♂ wing 195–210 mm, ♀ 214–237 mm; ♂ tail 126–135 mm, ♀ 131–157 mm; ♂♀ tarsus 59–70 mm. **Weights** No data.

**REFERENCES** Amadon (1982b), Blake (1977), Dunning (1982), Remsen & Traylor (1989), Robbins *et al.* (1991), Sick (1993).

## 170 WHITE-NECKED HAWK

*Leucopternis lacernulata* (Temminck, 1827)

Plate 55

Other name: Band-tailed Mantled Hawk

**DISTRIBUTION** Neotropical (10°S to 27°S); order 4; once common but now rare, local and seriously threatened by deforestation. Endemic to east and southeast Brazil: now very patchily in eight provinces, mainly northeast and southeast Minas Gerais, Espírito Santo, Rio de Janeiro and São Paulo, to a lesser extent also southern Alagoas and Bahia, and extreme eastern Paraná and Santa Catarina.



**MOVEMENTS** Perhaps largely sedentary, but evidently some wandering: has sporadically been recorded even in and around Rio de Janeiro itself; flights also noted between Ilha do Cardoso and mainland.

**HABITAT** Lowland primary forest, wooded savannah. Sea-level to 900 m, probably mainly below 500 m.

**FIELD CHARACTERS** Medium-sized white-and-black buteonine, relatively longer-winged and shorter-tailed than many of its congeners. Conspicuous when perched at forest edge (or, formerly at least, even on tops of dead trees), but generally stays more within cover at mid-storey level; wing-tips extend over half down tail. Sexes similar and have much the same size ranges, female averaging less than 4% larger; juvenile also similar, but distinguishable.

**PERCHED Adult** Whole head and underbody white, tinged with grey on nape and upper mantle; otherwise dark slate-grey above but for scattered white spots from lower back to rump and bars on lateral tail-coverts; basal half of tail itself slate-grey with some lateral white barring,

distal half white with black subterminal band. **Juvenile** Similar, but for blackish streaks on crown and mantle, thin white edges to smaller wing-coverts, inconspicuous buff to brown fringes on rest of upperparts, and more white blotches and bars on basal half of tail. **Bare parts** Eyes, cere and legs apparently yellow at all ages.

**FLIGHT** Smallish, stocky raptor with broad rounded wings and shortish but wide tail; wingspan 2.1 times total length. No descriptions of flight action, but circles low over forests on level wings. **Adult** Above, all-blackish wings, body and tail-base (apart from scattered white marks on back and lateral tail), contrasting white head and distal tail with black subterminal band; below, head, body and wing-linings all white, but black-tipped primaries, obscurely grey-banded secondaries with broader dark trailing edges, and mainly whitish tail but for dark basal barring and subterminal band. **Juvenile** Probably indistinguishable from underneath, but streaked crown and nape, and more white-mottled tail-base, should show on upper view.

**CONFUSION SPECIES** Range overlaps with that of only one congener, Mantled Hawk [174], very similar in pattern but easily distinguished by plain white distal half of tail against plain black base; it is also larger, longer-winged and relatively shorter-tailed, with darker lores and eyes giving masked effect, and, in flight from below, more barred secondaries show much thinner subterminal line. Mantled Hawk tends to live on higher ground and evidently feeds more on vertebrates, less on insects (as would be indicated, too, by its greater RSD). See also Grey-headed Kite [14].

**VOICE** Not described.

**FOOD** Apart from odd reports of small snakes, mammals and birds being taken, this species appears mainly to specialise on invertebrate prey, including insects, spiders and, to judge from one record of *Megalobulimus paranaquensis*, also gastropods. Insects include grasshoppers and other orthopterans, beetles, stick-insects and ants, though individuals also follow army ants *Eciton* and catch small prey disturbed or flushed by them. Similarly, they will also follow foraging birds and monkeys, and, once, even a human with a lawnmower. Catches food on ground and also forages in mid-storey foliage.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No displays described apart from mutual soaring.

**BREEDING** Nest apparently unknown.

**POPULATION** Species' range encompasses some 150,000 km<sup>2</sup> but, within the whole of that area, destruction of primary forest has been such that suitable remnants are highly fragmented and often well scattered. In São Paulo province, too, the bird is assumed to prey on poultry, though that would be remarkable for a raptor that feeds mainly on invertebrates. Even though it has been recorded in some 14 reserves and national parks, where it is comparatively safe, many of these are far apart. Densities are generally believed to be low, though few firm data: the population can perhaps be guessed at three or four figures, but that may

well mean only the hundreds. Surveys and ecological studies are urgently required.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 290–295 mm, ♀ 293–315 mm; ♂♀ tail 175–192 mm, tarsus 72–81 mm. **Weights** No data.

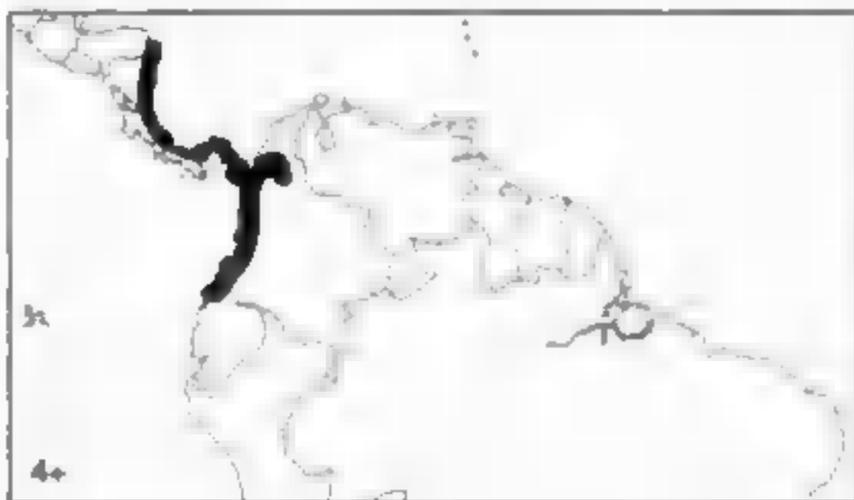
**REFERENCES** Aguirre & Aldrichi (1983), Albuquerque (1986), Amadon (1964, 1982b), BirdLife International (2000), Blake (1977), Collar (1996a), Collar & Andrew (1988), Collar *et al.* (1992), Descourtilz (1983), Martuscelli (1991, 1996), Meyburg (1986), Mitchell (1957), Sick (1993), Sick & Pabst (1968), Sick & Teixeira (1979).

## 171 SEMIPLUMBEOUS HAWK

*Leucopternis semiplumbea* Lawrence, 1861

Plate 55

**DISTRIBUTION** Neotropical (15°N to 0°); order 4+; generally considered uncommon to fairly common, but increasingly threatened in some parts by deforestation. Southeast Central and northwest South America: from easternmost Honduras and east Nicaragua, through Costa Rica and Panama (both mainly on Caribbean slope), to western Colombia (Pacific coast, also east along north base of west and central Andes, thence south in Magdalena valley to Santander) and extreme northwest tropical Ecuador (Esmeraldas, where now rare).



**MOVEMENTS** Apparently sedentary.

**HABITAT** Wet to humid primary tropical and subtropical forest, forest edge, occasionally remnant forest, locally also tall old secondary growth and cacao plantations; usually in lowlands, sometimes in foothills. Sea-level to 1,000 m, probably mainly below 500 m; reported once at 1,600 m.

**FIELD CHARACTERS** Small, chunky, slate-grey and white buteonine with short wings and shortish tail. Often remarkably confident, flying only when closely approached, but unobtrusive and easily overlooked: perches mainly in understories and lower canopies, often by clearings or at forest edge, if only rarely coming out fully into open; but, particularly in early mornings, sometimes sits sunning or preening for long periods on higher exposed branches; wing-tips just exceed base of tail. Sexes similar and, despite some overlap, females average 10% larger (biggest 26% larger than smallest males); juvenile similar, but easily distinguishable.

**PERCHED Adult** All slate-grey above, including upper cheeks, which give hooded effect; blacker tail usually has one white band (slightly farther down than on most congeners), but sometimes second one more or less concealed by coverts; underbody all white, or few blackish streaks at sides of upper chest; orange cere and feet.

**Juvenile** Broadly similar, but slight whitish streaking on head and mottling on mantle, as well as brown edges to wing-coverts, give upperparts less clean-cut appearance; tail shows two white bands, sometimes traces of third; below, thin black shaft-streaks most prominent on chest.

**Bare parts** Adult eyes yellow, juvenile yellow-brown. Adult cere yellow-orange to orange-red, juvenile orange-yellow to orange. Feet orange to orange-red.

**FLIGHT** Small, compact raptor with short, broad rounded wings and shortish tail; wingspan 1.7 times total length. Fast shallow beats, occasional short glides; no description of wing position in gliding; rarely, if ever, soars. **Adult** All dark above, with hood obvious from side, apart from white band behind black tail-end; below, white of body and wing-linings extends to bases of primaries, while flight-feathers otherwise greyish with thin dark bars, in contrast to banded tail. **Juvenile** Distinguished by somewhat streaky head with less clear hood, dark streaks across chest, and two white tail-bands.

**CONFUSION SPECIES** Superficial resemblance to Slate-backed Forest-falcon [264] (larger, eyes dark, cere and longer legs dull yellowish, longer greyer tail with 3 faint whitish to grey bars and tip) and pale-morph Short-tailed Hawk [191] (slightly larger, much longer-winged, eyes dark, cere and legs yellow, obscurely barred tail with no contrasting white band or bands, frequently soars). See also much larger Grey-headed Kite [14]. (No question of confusion with other small, pied and orange-cered 'white hawks' of genus *Leucopternis*; nearest is very different Black-faced [168] east of Andes; Plumbeous [166], which replaces Semiplumbeous at higher levels, is all dark but for barred thighs and sharply contrasting white underwings.)

**VOICE** Various calls described, but uncertain how much these differ or overlap. High thin whistle, either on one pitch or upslurred, often repeated several times; and more varied whistles in breeding season: forceful *kooyaler*

## 173 GREY-BACKED HAWK

*Leucopternis occidentalis* Salvin, 1876

Plate 56

**DISTRIBUTION** Neotropical (1°N to 4°S); order 3; rare. Endemic to small hinterland section of northwest South America: western Ecuador (Esmeraldas and Pichincha south to El Oro and Loja) and immediately adjacent northwesternmost Peru (Tumbes), but range now seriously fragmented by deforestation, leaving small isolated populations.



**MOVEMENTS** Probably largely sedentary, apart from any local wanderings forced by habitat destruction. (Report from eastern slope of Andes, just inside Peru at southern end of Cordillera del Condor, now considered erroneous.)

**HABITAT** Tropical and subtropical evergreen and semi-deciduous forest in lowlands, coastal cordilleras and west Andean foothills; ranges from humid lowland zone, through premontane and intermontane, to cloud forest, and sometimes never found in dry deciduous forest which previously avoided. Now in small remnant patches of forest (often degraded, and half secondary growth), especially in steep ravines and other broken country where land less easily converted to agriculture. Sometimes also perches in isolated trees left standing among cultivation (perhaps eking out existence without breeding?). Sea-level to 2,900 m, but chiefly 100–1,400 m (zone of most remaining forest).

**FIELD CHARACTERS** Largish black-and-white buteonine with medium-length wings and short tail. Often sits quietly at mid- to upper-storey levels, both inside forest and, more conspicuously, at edge, on bare branch or even in lone tree; wing-tips half down tail. Sexes similar, and female averages only 6% larger with some overlap (though largest may be up to 15% bigger than smallest males); juvenile similar, but distinguishable on good view.

**PERCHED Adult** Mainly blackish-grey above, streaked white on crown, nape, rear cheeks and mantle, and tipped white on scapulars as well as on blacker flight-feathers and some wing-coverts; white tail with broad black subterminal band; all white below apart from, often, few dark shaft-streaks on chest; cere grey and lores blackish. **Juvenile** Similar, but slightly paler and greyer above; still mainly white below, but blackish-grey blotches and streaks on chest, faint sparse barring on flanks. **Bare parts** Eyes brown. Cere grey. Feet yellow.

**FLIGHT** Medium-sized stocky raptor with broad round-tipped wings and short, full tail; wingspan 2.3 times total length. Flight perhaps similar to that of White Hawk [172], but active action and wing positions while gliding and soaring not described; circles over canopy, sometimes soaring high up. **Adult** Mainly dark above with streaky head and neck, but white of tail-base extends up between wings to mid-back, often with some dark spots on rump; broad black subterminal tail-band leaves only very narrow white tip (cf. White Hawk); extensively white below, including wing-linings, but for black-ended primaries, otherwise lightly barred flight-feathers with barely stronger subterminal line (again cf. White Hawk), and black subterminal tail-band. **Juvenile** Distinguishable in flight only if more extensive chest-spots or obscure barring on flanks visible.

**CONFUSION SPECIES** Not hard to identify within its limited range. Observations in southwest Colombia or in Ecuador or north Peru east of Andes (none as yet confirmed, but wandering perhaps not impossible as forest clearance continues) would have to exclude White Hawk [172]; apart from white head (at least), that very variable species always has much broader white tip to tail, while its nominate race (most of South America east of Andes) otherwise shows more black on tail, especially from above, and broader subterminal band on barred secondaries. See also Black-and-white Hawk Eagle [234], which, like other pied raptors in South America, has different proportions: longer, narrower wings, narrower and all-banded tail, as well as much whiter head, orange cere and white-feathered legs.

**VOICE** Few calls described. While perched, screeched *keeraart* and, from possibly immature bird, softer *peere*. In diving display flight, repeated drawn-out screeching *keeraart-keeraart...* described.

**FOOD** Poorly known, but from observations of prey being caught or carried, and recorded stomach contents of specimens, spectrum probably similar to that of many congeners: snakes (one 30–40 cm), lizards (one 14 cm), frogs, crabs, small rodents, and large insects (beetles, katydids). One thrush *Turdus* taken from mist-net. Still-hunting of crabs and frogs noted from low branches over streams, but may also forage in canopy.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs, often also threes or fours. In display flight, apart from mutual circling, one of pair seen to rise several hundred metres above the other and then dive almost vertically with drawn-out screeching.

**BREEDING** Little information. Probably December–April (wet season, when local avifauna mostly breeds); vociferous circling low over canopy noted January–March, and diving display and carrying of sticks on separate occasions in February, but nest still unknown despite increased fieldwork since 1980s. Habitat loss likely to result in high proportion of non-breeders.

**POPULATION** Species seriously threatened by rampant deforestation, also by hunting and other disturbance, including goats and cattle grazing in understorey. Over

rufous-tinged secondaries; obscurely barred tail also looks darker-tipped and paler-based below.

**CONFUSION SPECIES** Adult almost unmistakable, even though two of three other rufous to cinnamon-rufous adult buteonines may be found in same coastal mangroves: Savannah Hawk [179] (more extensively and paler rufous, including head and shoulders, with broad white tail-band, and looking entirely pale rufous from below except for tail and black tips to flight-feathers, as well as having different shape); and Black-collared Hawk [181] (again more extensively rufous, including body, inner wings and tail-base, with comparable flight pattern from both above and below, also distinguished by white head, black fore-collar and solid black outer wings and trailing edges). See also Bay-winged Hawk [180] (different habitat, blackish head and body, white tail-base, and rufous shoulders, thighs and wing-linings). Juvenile perhaps more easily confused with juvenile Savannah Hawk (but that, like adult, looks lankier, with smaller head, longer wings near tip of longer tail, as well as having whitish face, darker chest-sides and thighs, and more clearly dark-ended tail in flight from below). Confusion much less likely with juvenile Black-collared (not least because that has whitish head and black fore-collar like adult). Juvenile Great Black Hawk [178] can also overlap in habitat (but considerably larger, as well as relatively still longer-tailed and longer-legged, with paler trailing wing-edges and tail-end from below). Otherwise, habitat and behaviour should normally confirm identification, and no buteos that might conceivably occur along same coasts should cause any problems.

**VOICE** Loud melodious whistle attracts attention. Also musical laugh of six or seven notes, the first three or four rapid, the rest slower and descending.

**FOOD** Exclusively crabs. Still-hunts from prominent perch, pouncing down when suitable victim sighted and

either grasping it in the mud or sometimes snatching it up without alighting. (By analogy with congeners, may also forage on foot, but this apparently not recorded.) Crab then carried to dry feeding place, which, if in regular use, becomes surrounded with broken carapaces and other remains.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, more usually, in pairs. Aerial displays include single or mutual high-circling, diving by pair-members at one another, and undulating sky-dance (by male alone?), all accompanied by much calling.

**BREEDING** February–August in Surinam, probably September onwards in southeast Brazil. Nest of twigs, lined with green leaves, in mangrove or other creekside tree. Clutch 1 (1–2). Incubation and fledging periods not recorded.

**POPULATION** Almost entirely linear distribution of around 6,000 km of coastline. Even average of 1 pair/km would give five-figure population: this is generally commonest mangrove hawk with higher densities than that in some areas, while in others it extends several kilometres inland along creeks. But mangrove is an ever-decreasing habitat and this species is likely to be declining.

**GEOGRAPHICAL VARIATION** Monotypic. Has been treated as allospecies in Mangrove Black and Common Black Hawk superspecies [176, 177], but probably not so closely related.

**MEASUREMENTS** ♂ wing 310–325 mm, ♀ 315–332 mm; ♂♀ tail 153–166 mm, tarsus 76–81 mm. **Weights** ♂ 506–665 g, ♀ 725–945 g.

**REFERENCES** Amadon (1961c, 1982b), Blake (1977), Haverschmidt (1962), Meyer de Schauensee & Phelps (1978), Sick (1993), Snyder (1966), Tostain *et al.* (1992), Young (1929)

## 176 MANGROVE BLACK HAWK

*Buteogallus subtilis* (Thayer & Bangs, 1905)

Plate 57

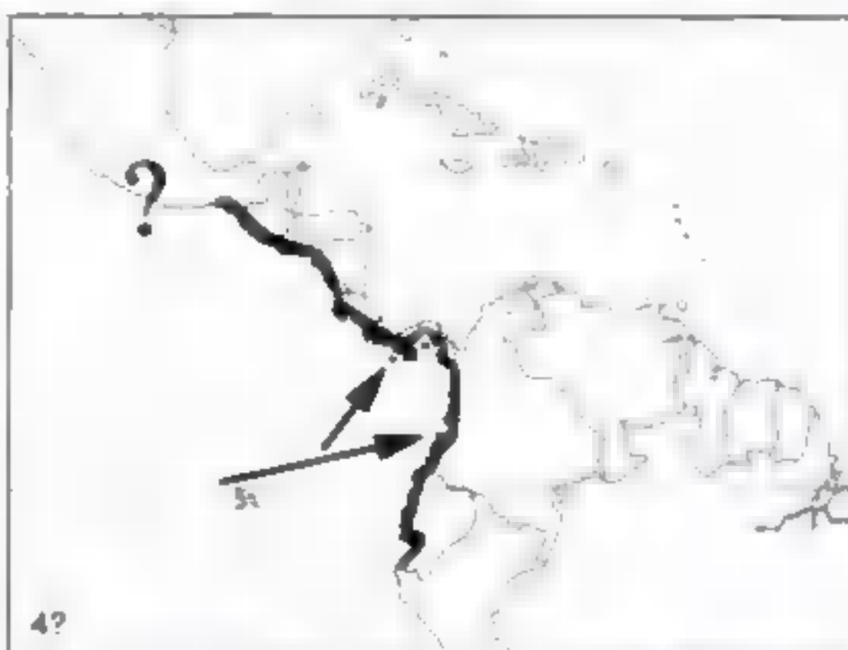
Other name: Pacific Black Hawk

**DISTRIBUTION** Neotropical (16°N to 4°S); order 4?; rare and local to fairly common. Pacific coast of south-east Mexico, Central America and northwest South America: from extreme southeast Mexico (Chiapas) along Pacific coast of Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama to west Colombia, and continuing south to west Ecuador and extreme northwest Peru (Gulf of Guayaquil); range includes such offshore islands as Coiba, Cebaco and Archipiélago de las Perlas (Panama), Gorgona (Colombia) and Isla Puná (Ecuador).

**MOVEMENTS** Evidently rather sedentary.

**HABITAT** Especially coastal mangroves; but, at least in Panama, apparently also locally inland by rivers and freshwater swamps. Most habitats probably no more than few metres above sea-level.

**FIELD CHARACTERS** Lankish buteonine, mainly black



as adult, with relatively short wings and short tail but longish legs; streaky juvenile has longer tail made to look longer still by narrower wings. Sluggish; perches,

often low down and unobtrusively for long periods, in mangroves or on dead branches or stumps; also walks about on mud and even wades in shallows; wing-tips over half down tail but well short of tip. Sexes similar, and female averages only 4% larger, with much overlap; juvenile quite different (also has dilute variant, of which adult equivalent apparently unrecorded: see Geographical Variation).

**PERCHED Adult** Mainly black with broad white median tail-band and thin white tail-tip, very like Common Black Hawk [177] but for smaller size, sex for sex, and slightly more rufous tinge perhaps just showing through on obscurely dusky-banded secondaries and some other feather-edges. **Juvenile** Dark brown above, edged white and buff, with dusky-banded whitish tail; and buff below with streaked face and throat, blotched breast and flanks, and barred thighs; again much like Common Black Hawk, but for slightly more rufous tinge to secondaries and apparent lack of dark malar stripes. **Pale variant (juvenile type)** Dull grey-buff, finely streaked brownish on head, obscurely blotched as result of still paler feather-edges on back and wings, and slightly darker marks on breast, faintly barred flanks and thighs: known mainly from Panama, presumably due to genetic lack of eumelanin (see Geographical Variation). **Bare parts** Eyes brown. Adult cere and bare lores bright yellow, juvenile duller. Adult legs rich yellow, juvenile paler.

**FLIGHT** Proportions much as those of slightly larger Common Black Hawk [177], though wings fractionally shorter. Flight actions apparently similar. **Adult** Mainly black with broad white tail-band and thin tail-tip, but rufous tinge to finely dusky-banded secondaries, particularly from below, and whitish to pale rufous patch (more extensive than on Common Black Hawk) at base of outer primaries. **Juvenile** Narrower-winged and longer-tailed than adult; dark brown above with barred tail, and buff windows at base of primaries; and buff below with irregular streaks and blotches on body and wing-linings, barred thighs to tail, dark carpal arcs, whitish-buff windows, and rufous secondaries. **Pale variant (juvenile type)** Overall dull grey-buff, looking fairly uniform despite obscure markings (see 'Perched'), but streaked crown may give slightly capped appearance and paler windows at bases of primaries should still show through.

**CONFUSION SPECIES** At all ages very like Common Black Hawk [177] (which see for mention of other possible confusion species): latter's slightly larger size and longer wing length impossible to determine in field, but that has less rufous secondaries, particularly from below, both as adult (which otherwise differs only in smaller white patch at base of outer primaries) and as juvenile (which otherwise has strong malar stripes). Unfortunately, sluggish Mangrove Black Hawks are seen mainly perched, settled on ground or in low flight, where underwing features are impossible to determine, but they are specialists virtually confined to this habitat.

**VOICE** Series of shrill whistles, said to be indistinguishable from those of Common Black Hawk [177] (but this needs further analysis).

**FOOD** Crabs, perhaps almost exclusively; said also to

take stranded fish. Watches from low perch, but often forages by walking on mud or wading into shallows and chasing prey on foot.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No descriptions of aerial displays.

**BREEDING** Few data, but compare Common Black Hawk [177]. Season January–May in Panama, where descriptions of bulky stick nests, usually high in mangroves, probably relate to this species.

**POPULATION** Like Rufous Crab Hawk [175] on South American Atlantic coast, this is another mainly mangrove bird with a largely linear distribution along coasts and islands, this time over nearly 5,000 km. Again, average of 1 pair/km would just give five-figure population, but that may be on high side for an allospecies, or group of subspecies (see Geographical Variation), that seems generally rather rare on the South American Pacific coast (e.g. few records for Colombia) and little studied, if locally common, on the Central American section. Thus, a population of only thousands is suggested and, like other birds of threatened mangrove, it may well be decreasing.

**GEOGRAPHICAL VARIATION** Still often treated as conspecific with Common Black Hawk [177], on the grounds of lack of discernible differences in voice or behaviour and of wing length being more variable in mangrove populations than the measurements quoted below suggest; but, from underneath, these Pacific coastal birds appear consistently more rufous on secondaries, with larger pale patch at base of primaries, and show no intergradation where range comes close to that of typical Common Black Hawks. (Situation further complicated, however, by isolated populations of Cuba and Isla de la Juventud [Isla of Pines], and of Islas de la Bahía off Honduras, which are somewhat intermediate in character.) Three races have been recognised, *B. s. subtilis*, *B. s. rhizophorae* and *B. s. bangsi*, but measurements seem very similar and insufficient material available to substantiate differences. Pale variants also occur, apparently with some regularity at least in Panama, and are presumably schizochroic individuals with eumelanin deficiency: unless this pale dilute consistently fails to survive beyond immaturity, which seems unlikely, the equivalent adult plumage is perhaps of the juvenile type.

**MEASUREMENTS** (all races combined) ♂ wing 324–348 mm, ♀ 336–365 mm. **Weights** No data.

**REFERENCES** Amadon (1961c, 1982b), AOU (1983), Davis (1972), Hilty & Brown (1986), Howell & Webb (1995), Monroe (1968), Ridgely & Gwynne (1989), Slud (1964), Stiles & Skutch (1989), Wetmore (1965).

and south Tamaulipas southwards on both slopes) through Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica and Panama to Colombia, thence down to tropical west Ecuador (where very rare, if not extinct) and, east of Andes, from north and east Colombia, Venezuela and Guianas through east Ecuador, northeast Peru and much of Brazil to northeast Bolivia, Paraguay, north Argentina (south to Tucumán, central Santa Fé and Entre Ríos) and Uruguay; also Trinidad and Tobago (uncommon).



**MOVEMENTS** Probably rather sedentary, but some evidence of wandering; South American race has been found as far into Panama as eastern San Blas, and Central American birds may occur over the border into Colombia (northwest Chocó); also seen occasionally south of breeding range in east Argentina (at least six records in northeast Buenos Aires province).

**HABITAT** Not so restricted to extensive water as Common Black Hawk [177], often in drier forest and uplands near streams, and far less in coastal habitats; present in humid forest swamps and riverine trees, galleries, locally even mangroves, but catholic range includes secondary growth up into foothills and middle elevations, as well as open woodland, wooded savannah and, if water not too far away, even dry scrub or cultivation or old pastures with scattered trees; locally also pine-oak forest or saguaro cactus slopes above streams or lakes and, in Argentina, dry and humid chaco woodlands. Mostly sea-level to 900 m, but up to 1,200 m in South and, very locally, 1,900 m in Central America.

**FIELD CHARACTERS** Large, thickset buteonine, mainly black when adult, with relatively short wings, shortish tail and longish legs but short toes; streaky juvenile has narrower wings and longer tail. Rather sluggish; perches unobtrusively inside cover, often in canopy, sometimes more openly, not moving for long periods; walks and runs easily on ground; wing-tips clearly short of tail-tip, particularly on juvenile. Sexes similar, and female averages less than 5% larger, with much overlap, but perhaps 28% heavier; juvenile quite different, second-year and third-year also distinguishable; not fully adult until fourth-year cf. Common Black Hawk [177].

**PERCHED Adult** Mainly black with white or white-spotted uppertail-coverts, thin white tail-tip, and either wholly white basal half of tail (South America) or broad white median tail-band with second thin bar at base and white-speckled or obscurely barred thighs (Central America). **Juvenile** Dark brown above, edged rufous-buff and white, with buff-streaked crown and narrowly dark-banded tail; buff face, including supercilia above thin dark eye-stripes, but cheeks more or less plain and no clear malar stripes; all whitish to orange-buff below, with plain throat, dusky-blotched body, and barred thighs and crissum. **Second-year** Not unlike juvenile, but more uniform brown above, tail whiter with fewer and coarser bars, underparts rather less heavily blotched; sometimes shows indistinct malar stripes (cf. Common Black Hawk [177]). **Third-year** Mainly blackish like adult, but head and chest variably flecked buff, tail black with up to four wavy white bands. **Bare parts** Adult eyes dark brown, juvenile brownish-white to brown. Adult cere yellow to greyish-yellow and bare lores slaty-grey to dull yellowish (Central America) or all yellow to orange-yellow (South America), juvenile greenish-yellow. Adult legs yellow to pale orange-yellow, juvenile greenish-yellow to pale yellow. **FLIGHT** Medium-large, stocky raptor with relatively short, broad, rounded wings, slightly bulging secondaries and shortish tail; wingspan 2.0 times total length. Slow strong beats; glides and soars on flat wings. **Adult** All black apart from more or less white rump and narrow tail-tip, and either whole tail-base white (South America) or broad white median tail-band and wing-linings and thighs inconspicuously speckled or obscurely barred with white (Central America); obscurely barred greyer secondaries and, from underneath, little or no whitish at base of primaries (cf. Common Black Hawk [177]); yellow legs and, in South America, yellow facial skin conspicuous. **Juvenile** Narrower-winged and longer-tailed than adult; dark brown above, strongly streaked on crown and nape, apart from buff window towards base of primaries and many narrow blackish tail-bars; and variably whitish to orange-buff below, with rather plain face and throat, irregular streaks and blotches on body and wing-linings (these marks often coalescing into blackish patches on chest-sides and less on flanks), usually barred thighs, nearly plain crissum, finely barred whitish tail, not very prominent dark carpal arcs (often extending into line on greater coverts), dark-tipped primaries, whitish-buff windows, and thinly and obscurely dark-banded tawny secondaries. **Second-year** More uniformly dark brown above, and with less distinct window towards base of primaries, but paler uppertail-coverts and tail more contrastingly barred greyish to whitish and dark brown; below, body and wing-linings plainer buff with fewer markings, primary windows again less obvious (but still translucent when backlit), secondaries grey and less barred, and tail whitish with three to five dark bars and broader subterminal band (but this very like tail of juvenile Common Black Hawk [177]; see Confusion Species). **Third-year** Now largely blackish like adult and any buff flecks on head, chest and wing-linings inconspicuous, but often readily distinguished in flight by two to three retained dark-banded buff inner primaries forming light wedge, slightly paler grey secondaries (cf. Lesser) and two to four boldly contrasting wavy white (above) or creamy-buff (below) bands on black tail (but

note that tail may sometimes appear like this when bird still more or less in second-year plumage).

**CONFUSION SPECIES** Easily confused at all ages with very similar Common Black Hawk [177], which overlaps in size, though generally smaller, and relatively longer-winged and shorter-legged: adult Common Black Hawk distinguished by lack of white on uppertail-coverts (any white at base of tail also hidden, so only white is median band and thin tip) and, in flight from underneath, fairly obvious whitish patch at base of primaries; also in Central America (main area of overlap), lores yellow (not slate), thighs and wing-linings virtually plain; juvenile distinguished by boldly patterned face with streaks and malar stripes, barred undertail-coverts, and whiter tail above with fewer but broader dark bars and subterminal band (5–7 against 10–14) that leave it looking darker underneath. In Central America (and, to lesser extent, northernmost South), adult Black Solitary-eagle [185] can also be problem, being all dark with similar single white tail-band and narrow tip, but slate-grey (rather than black) and larger, with longer and broader wings, longer upswept primaries, and relatively short tail; wing-tips reach tail-tip at rest; juvenile less difficult because, apart from size and shape, body markings much heavier below, including more or less solid black chest-sides, thighs and crissum, and secondaries and tail unbarred (though darker subterminally). See under Common Black Hawk for discussion of confusions with Zone-tailed Hawk [199] and other dark buteos, black Crane-hawk [164], Slate-coloured and Plumbeous Hawks [165, 166], black-morph Hook-billed Kite [15], and larger Black Vulture [1]; see also subadult Black Hawk Eagle [244] (greater head projection, paddle-shaped wings and longer tail, both with quills evenly barred).

**VOICE** Noisy, both perched and in flight, but quite different from Common Black Hawk [177]: again, high and shrill though thinner *keeeeeeeeth*, or prolonged with the second half rising, *keeeeeeeleeeee*, not in series; also loud harsh scream, *whooooooooo*, when disturbed (based on Stiles & Skutch). In Argentina, however, call flute-like, and in Brazil prolonged series of rapid *bi, bi, bi...*

**FOOD** Tends towards larger and more active prey than Common Black Hawk [177], but selection catholic and food spectrum overlaps: snakes (some poisonous), geckos and other lizards, rats and other small mammals (including bats), and birds (including chickens), as well as eggs and nestlings (even fallen young of colonial egrets *Egretta* and spoonbills *Platalea*), fish, amphibians, crabs, large insects, fruits and carrion. Last have included cayman carcass and snake roadkills (Haverschmidt). Eats only hindlegs of large Brazilian frogs *Ceratophrys dorsata*. Longish legs aid fishing for aquatic animals. Sometimes still-hunts, particularly from waterside perch, but also actively forages from one patch of waterside vegetation to next, or within forest by moving from perch to perch, pausing only for scan around, or by transect-flights over more open ground; also attracted to grass fires. In southwest Brazil, seen to chase Plumbeous Ibis *Theristicus caeruleus* off nest before eating eggs.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, very often, in pairs. Generally regarded as soaring less than Common Black Hawk [177], but much single and mutual

high-circling in breeding season, sometimes with legs dangling. No aerial acrobatics described, but some form of undulating sky-dance to be expected.

**BREEDING** Evidently December–May in southern Central America, but June–November at comparable latitudes in north Venezuela and Surinam; October onwards in north Argentina. Stick nest of variable size, with deep cup lined with twigs and green leaves, at 6–20 m in wide variety of trees from mangrove to palm, pine or forest deciduous; in north Argentina also on telephone and high-tension poles, using old nests of Monk Parakeet *Myiopsitta monacha* and other birds as basis. Clutch 1–2, but normally only one young reared. Incubation c40 days. Fledging period not recorded, but young seen near nest begging for food seven months after fledging.

**POPULATION** One of the commonest species at one French Guianan forest site, with at least 17 birds/100 km<sup>2</sup>, but otherwise generally regarded as uncommon or, at best, only very locally common. Vast distribution, however, encloses nearly 14 million km<sup>2</sup> and average densities of just 1 pair/250 km<sup>2</sup> would give total into six-figure range. Not unduly affected by forest clearance: in extensively felled areas of north Argentina, has adapted by nesting in open artificial sites.

**GEOGRAPHICAL VARIATION** Two races recognised.

*B. u. urubitinga* (South America, perhaps easternmost Panama) Averages slightly larger and longer-winged, particularly towards south of range (southernmost birds formerly distinguished as *azarae*, purely on size, but whole species shows cline of increasing size from north to south and, like several other South American raptors, this increase appears to accelerate beyond the tropical zone); lores yellow; uppertail-coverts and whole basal half of tail white (incorporating median band); wing-linings and thighs plain black.

*B. u. ridgwayi* (Mexico to Panama) Lores slate-coloured; uppertail-coverts and inconspicuous basal tail-bar white but separated from broad median tail-band; wing-linings and thighs respectively finely spotted and obscurely barred with white. These two races have sometimes been regarded as distinct species, and there may be vocal differences, but intermediates have been examined in eastern Panama.

**MEASUREMENTS** *B. u. urubitinga* ♂ wing 377–407 mm, ♀ 383–440 mm; ♂ tail 230–260 mm, ♀ 230–270 mm; ♂♀ tarsus 110–122 mm. *B. u. ridgwayi* ♂ wing 363–403 mm, ♀ 360–417 mm; ♂ tail 226–274 mm, ♀ 237–270 mm; ♂♀ tarsus 108–127 mm. **Weights** *B. u. urubitinga* ♂ 965 g–1.31 kg, ♀ 1.36–1.56 kg, *B. u. ridgwayi* ♂ 1.01–1.32 kg (three), ♀ 1.4 kg (one); ♂ 853–996 g, ♀ 900 g–1.25 kg (HBW).

**REFERENCES** Amadon (1982b), Belton (1984), Blake (1977), Brodie & Bansev (1993), Contreras *et al.* (1990), de la Peña (1992), Dickey & Rossen (1938), Gerhardt *et al.* (1992, 1993), Harris *et al.* (1991), Haverschmidt (1968), Hellmayr & Conover (1949), Hilty & Brown (1986), Howell & Webb (1995), Lewis & Timm (1991), Mader (1981), Meyer de Schauensee & Phelps (1978), Monroe (1968), Olmos (1990b), Olrog (1985), Partridge (1954), Ridgely & Gwynne (1989), Sick (1993), Slud (1964), Smith (1955), Stiles & Skutch (1989), Thiollay (1989a/b), Tostain *et al.* (1992), Trail (1987), Voous (1969).

collared Hawk [181] (stockier, more uniformly cinnamon-rufous above, and easily distinguished by white head and black fore-collar at all ages as well as, in flight, by all-black primaries, chestnut tail-base, and no white tail-band). Although both very differently shaped, see also adult Rufous Crab Hawk [175] (essentially coastal, and black head and upperparts and heavier black barring below make confusion unlikely when settled, but in flight from underneath looks mainly dark rufous with black head, primaries and trailing edges, and subterminal tail-band behind thin white median bar); and adult Bay-winged Hawk [180] (more or less blackish head, body and flight-feathers, with white tail-base and broader tip, and rufous confined to shoulders, thighs and wing-linings). Juvenile less immediately obviously different from several other round-winged hawks but, when perched, lanky shape with creamy face and more or less rufous-barrered secondaries and thighs distinctive; and, in flight, long wings and combination of dark patches at chest-sides and thighs with broad dark trailing edges and subterminal tail-band distinctive enough. Sometimes confused with juvenile Snail Kite [29], perhaps because of creamy face and some rufous tones (but that has thin, deep-hooked bill, long paddle-shaped wings exceeding tip of notched tail, white tail-base and quite different flight pattern).

**VOICE** Generally silent except in breeding season; even then, less noisy than congeners. Main call (when perched as well as in flight?) is prolonged shrill whistle, variously transcribed as *eeeeee-eh*, *kree-ee-ee-er*, or *shieh* terminating in wail. Short grating snarl, *krrrh*, repeated while circling over intruders at nest.

**FOOD** Small mammals, lizards and snakes, frogs and toads, insects and spiders; elsewhere, or at particular seasons, many crabs, eels and other fish, and significant numbers of birds. Typically still-hunts from low perch; also stoops on prey during transect-flights, and often forages on foot. Numbers may gather at grass fires, some walking slowly only a few metres from flames; and one or several may follow ploughs. Aerial piracy of fish from storks (Ciconiidae) and herons (Ardeidae) also recorded.

**SOCIOSEXUAL BEHAVIOUR** Often solitary, or soaring in twos and threes, but groups of 10–50 may gather at rich prey sources; as many as 100 together in Colombia. Single and mutual high-circling accompanied by shrill whistles and often dangling legs; may also descend on set wings with legs hanging, but no undulating sky-dance apparently described.

**BREEDING** Best known in north Venezuela, where nearly throughout year (certainly February–November), but

mainly April–October with early wet-season peak in June–August. In Colombia and Trinidad most evidently February–June, and in Surinam December–May, but in Bolivia and north Argentina perhaps September–January. Nest of twigs, lined with leaves or grass; initially quite small, but size variable depending on amount of subsequent re-use; often in fork of fairly small isolated savannah tree or, elsewhere, more hidden among palm fronds, forest-edge bromeliads, or mangroves. Clutch 1 (1–2). Incubation 39 days. Fledging 45–50 days, with young dependent for further 4–7 months.

**POPULATION** Relatively common species with extensive breeding distribution that takes in over 12 million km<sup>2</sup>. In palm savannah, recorded density of 1 pair/0.41 km<sup>2</sup>. No other data on densities, but average of only 1 pair/240 km<sup>2</sup> would give population in low hundreds of thousands and it is much more numerous than that in some regions. Evidently also spreading as result of forest clearance.

**GEOGRAPHICAL VARIATION** Formerly placed in monotypic genus *Heterospizias* but, despite its lanky and long-winged shape, clearly very closely related, both morphologically and behaviourally, to the black hawks *Buteogallus* and now generally combined with them. Southern populations in south Paraguay, southeast Brazil and northern Argentina have been distinguished as *rufulus* on grounds of being larger, but increasing size towards the south, particularly outside the tropical zone, is characteristic of several South American raptors and the pattern is generally one of an accelerating cline. A better case can perhaps be made for the subspecific distinction of *australis* (Argentina only, except north Misiones) because not only does it appear to be consistently larger, as well as darker on the back and more extensively rufous, but seems on wing-measurements to show as much higher RSD, perhaps suggesting a greater concentration on more mobile prey.

**MEASUREMENTS** (all combined) ♂ wing 375–435 mm, ♀ 375–432 mm; ♂ tail 196–221, ♀ 197–233 mm, ♂♀ tarsus 90–113 mm. *B. m. meridionalis* ♂ wing 375–409 mm, ♀ 375–415 mm. *B. m. 'australis'* ♂ wing 406–435 mm, ♀ 430–452 mm. **Weights** ♂ 785 g–1.04 kg (three), ♀ 921–960 g (two); (sexes combined) 825 g–1.07 g.

**REFERENCES** Anadon (1964, 1982b), Belton (1984), Blake (1977), de la Peña (1992), Haverschmidt (1955, 1962), Hayes (1991), Hellmayr & Conover (1949), Hilty & Brown (1986), Mader (1981, 1982), Meyer de Schauensee & Phelps (1978), Natosky & Di Giacomo (1993), Partridge (1954), Plotnick (1956), Ridgely & Gwynne (1989), Sick (1993), Tostain *et al.* (1992), Voous (1969), Wetmore (1965).

## 180 BAY-WINGED HAWK

*Parabuteo unicinctus* (Temminck, 1824)

Plate 59

Other names: Bay-winged is species name in main South American range, while Harris' Hawk (or better Harris's) strictly applies only to North and Central American race *harrisi*

**DISTRIBUTION** Southern Nearctic and Neotropical

(35°N to 44°S); order 5+; uncommon to fairly common, or even locally common, with wide but very patchy distribution and considerable gaps. Southernmost USA, Mexico, parts of Central America, and South America mainly east of Andes (except Amazonia and far south); southern Arizona, southeast New Mexico and south

in each case; soars to considerable heights 'for hours on end'. **Adult** Pattern broadly similar from above and below, with, apart from whitish head and black fore-collar, mainly cinnamon-rufous body, inner wings and barred tail-base, and sharply contrasting black primaries and primary coverts, broad black tips to secondaries, and mainly black distal tail. **Juvenile** Slightly narrower-winged and longer-tailed than adult; looks darker reddish-brown and dusky-mottled above, apart from black-streaked creamy head; below, whitish head and black collar, pale breast with scattered streaks or blotches, and contrasting dark-banded rufous abdomen, stand out from general cinnamon-buff tone with finely barred wings showing up dark tips and carpal arcs, and whiter tail with broader subterminal band.

**CONFUSION SPECIES** Virtually unmistakable at any age, because of whitish head and black dog-collar. Only other predominantly cinnamon-rufous raptor is adult Savannah Hawk [179], but that tankier, with head same colour as body, much less black on outer halves of narrower wings, white band on longer tail; juvenile has whitish face and blackish patches at sides of chest, but otherwise darker above and creamier below (apart from same differences as adult in shape). Adult of essentially coastal Rufous Crab Hawk [175] has comparable, if much darker, flight pattern from below (though not from above), apart from entirely black head. Although also extensively rufous on wing-coverts and thighs, Bay-winged Hawk [180] completely different in other colours, pattern, shape, flight and behaviour. Because of water association, see also female/immature plumages of Snail Kite [29], though that is much smaller and very different in appearance.

**VOICE** Usually silent. Descriptions include pig-like squeal, variously interpreted as reedy whistled scream, *wherrrrrr*, rising and falling, a breathy harsh scream with abrupt start, *BE-yurr*, and nasal whistle; also protracted guttural or heron-like croak, disyllabic cough *Ac-ahh*, and insect-like buzz slowing to harsh ticking.

**FOOD** Chiefly fish; also frogs, waterbird chicks, waterbugs and other larger insects, molluscs; at least occasionally small birds and mammals, also lizards. Still-hunts from dead branch overhanging shallows, or from adjacent bush or pole, or from flooded post or other emergent object, and glides or swoops to surface or shallows to grab prey. Feet have spiny soles to toes and markedly curved talons, comparable to Osprey [8], but plumage not similarly waterproofed and so, when more than legs immersed, has to perch for long periods drying out; sometimes waterlogged to extent of having to flop to dry ground.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs,

though ten or more can sometimes be seen at one time perched singly over extensive area of suitable habitat. Aerial displays seem mainly to involve long periods of single and mutual high-circling, but its returns to perches may involve spectacular dives, while one descended with legs dangling and tail pumping.

**BREEDING** June–December in Surinam, but probably April onwards in Guyana and Colombia; from August or September in Paraguay and north Argentina; September nest in El Salvador. Rather large nest of sticks, probably lined with greenery, at 12–15+ m in large tree, which may be at edge of waterside forest or amidst mangroves, or farther away from water in shade tree in coffee plantation. Clutch 1–2. Incubation and fledging periods not recorded.

**POPULATION** Although uncommon in north of range, this species is often locally numerous in South America, where there are many suitable swamps and which accounts for 90% of its total distribution over more than 11 million km<sup>2</sup>. Six-figure population suggested as this would involve an average density of between 1 pair/220 km<sup>2</sup> and 1 pair/22 km<sup>2</sup>, but no hard data available other than roadside observations of perched birds every few hundred metres in some places. Marked decline in some regions, particularly of Central America, as result of drainage and development.

**GEOGRAPHICAL VARIATION** Some variation in size (increasing to south) and head colour (whitening to south), though this probably clinal. Two races usually recognised.

*B. n. nigricollis* (most of range south to Bolivia and Brazil) Smaller; creamy-headed.

*B. n. leucocephalus* (Paraguay, north Argentina, possibly Uruguay) Larger; whiter-headed.

Although always treated as a buteonine, closest to the black hawks and Bay-winged (Harris's) [175–180], relationship with the kites has been suggested (Olsen).

**MEASUREMENTS** *B. n. nigricollis* ♂ wing 358–383 mm, ♀ 380–405 mm; ♂ tail 157–182 mm, ♀ 175–183 mm; ♂♀ tarsus 72–89 mm. *B. n. leucocephalus* ♂ wing 386–420 mm, ♀ 415–445 mm. **Weights** *B. n. nigricollis* ♂ 391–717 g, ♀ 580–829 g. ♂♀ said to average 650 g; ♂ 695 g, ♀ 796 g.

**REFERENCES** Amadon (1964, 1982b), Belton (1984), Blake (1977), de la Peña (1992), Contreras *et al.* (1990), Gore & Gepp (1978), Haverschmidt (1955, 1962, 1968), Hayes (1991), Hilty & Brown (1986), Howell & Webb (1995), Meyer de Schauensee & Phelps (1978), Monroe (1968), Narosky & Yurietta (1993), Olsen (1987), Ridgely & Gwynne (1989), Sick (1993), Stud (1964), Sules & Skutch (1989), Tostain *et al.* (1992), Voous (1969).

## 182 BLACK-CHESTED EAGLE-BUZZARD

*Geranoaetus melanoleucus* (Vieillot, 1819)

Plate 58

Other names: Black-chested, Black or Grey Buzzard-eagle or Eagle-buzzard, Black-chested Eagle

**DISTRIBUTION** Neotropical (9°N to 56°S); order 5; rare (especially in north) to fairly common, with wide

but patchy distribution and uncertain limits. Length of Andes, and across various other parts of southern half of South America: from northwest Venezuela (Cordillera de Mérida) through mountains of Colombia (mainly in eastern Andes, but south from Cauca in western-

central, too), Ecuador, and Peru (where also in coastal hills); thence, although continuing down Andes of Bolivia, Chile (again coastal regions, too) and Argentina to Tierra del Fuego, also more widespread across east and southeast Bolivia, Paraguay and south and east Brazil (north at least to Bahia and apparently even Piaui and Paraiba) southwards through Uruguay and eastern Argentina (where may be seen almost anywhere).



**MOVEMENTS** Adults generally assumed to be sedentary and juveniles perhaps more nomadic; but home ranges of settled pairs can apparently be vast and extend far over non-breeding areas. In northern Andes supposed not to leave the mountains, but a record at 600 m in Venezuela suggests that this high long-distance soarer may be overlooked in more lowland areas of the northwest.

**HABITAT** Thin dry woodland, espinal woodland, savannah, grassland, dunes, semi-desert scrub, monte desert, open hills, but commonest on steep and rocky uplands, broken mountain slopes with canyons, and adjacent steppes (but not extending much to high páramos). Mostly sea-level to 3,500 m, but in northern Andes not below 1,600 m, mainly above 2,500 m, and in Venezuela to 4,500 m; occasionally seen higher still.

**FIELD CHARACTERS** Eagle-sized (but not a true eagle), among largest and bulkiest of all buteonines, slaty and white or barred as adult, with relatively large and deep but not eagle-like bill, long wings, stubby wedged or rounded tail, bare legs. Perches on trees, posts, rocks and cliffs, and sometimes on level ground (though most often seen soaring); wing-tips exceed tail-tip on adult, but fall well short on longer-tailed juvenile. Sexes similar, but female usually obviously larger and apparently much heavier (wing lengths overlap and indicate average of only 3% bigger, but largest females 24% bigger than smallest males); juvenile very different; distinct immature plumage in second year, not fully adult until third or fourth.

**PERCHED Adult** Head and whole upperparts almost solid dark slate-grey to slate-black (few scattered white tips on longer and more pointed feathers of chest and mantle, faint barring on secondaries), except for paler lower cheeks and throat, ash-grey shoulders (lesser and median coverts) with fine dark bars and black shaft-streaks, and narrowly white-tipped tail; blackish chest sharply demarcated from white abdomen and undertail-coverts, which all either finely barred with blackish (Andes westwards) or plain (elsewhere: see Geographical Variation). **Juvenile** Blackish-brown above, streaked cinnamon and whitish on crown and nape, with buff supercilia, and edged rufous-buff on back, scapulars and shoulders, greyer-brown tail mottled and finely barred blackish; buff to rufous-buff throat and breast, former thinly streaked with dark brown, latter with odd streaks and blotches but often looking almost plain in contrast to heavily blackish-barréd or almost solidly dark thighs, belly and crissum. **Second-year** After first moult, still mainly blackish-brown above with streaky head and pale supercilia, but fewer pale tips on back and greater coverts, while lesser and median coverts more clearly edged and mottled with buff and grey to give effect of paler shoulders; tail mixture of shorter black (adult) and longer barred and browner (juvenile) feathers; throat and breast densely covered with black blotches, while abdomen becomes rufous-buff with thin dusky barring (thus reversing juvenile's pale breast, dark abdomen). **Third-year** More like adult, but usually scattered immature feathers retained, most noticeably causing some buff mottling on shoulders, as well as on lower abdomen, which less sharply demarcated from blackish chest. **Bare parts** Eyes brown. Cere and legs yellow.

**FLIGHT** Large raptor with long and very broad-based wings, somewhat pointed at long-fingered tips, thus combining with very short and wedge-shaped or sharply rounded tail, often fanned, to give impression of triangular outline; head projects less than on true eagles; juvenile tail 3–4 cm longer than adult's, with surprisingly more obvious projection at rear, but still wedge-shaped; adult wingspan 2.4 times total length. Slow powerful beats at take-off, but mostly glides and soars on flat or very slightly raised wings with long fingers upswept.

**Adult** All blackish above, apart from clearly paler grey forewings; below, white or finely barred abdomen and wing-linings (all looking silvery-white at any distance) stand out from slaty head and chest, thinly white-tipped black tail and dark-looking, narrowly barred flight-feathers. **Juvenile** Clearly longer-tailed than adult; mainly blackish above, apart from somewhat streaky head, slightly paler-based primaries and, in fresh plumage at close range, pale edges on wing-coverts; below, relatively unmarked buff to rufous-buff breast contrasts with almost solidly blackish-looking lower underparts and usually well-blotched wing-linings, again slightly paler-based primaries forming window. **Second-year** Above, still mainly blackish with streaky head, but inner forewings (lesser and median coverts) mottled paler; below, in reverse of juvenile, contrast now between largely blackish throat to breast and mainly buff to rufous-buff lower underparts and wing-linings; tail beginning to be mixture of shorter and longer feathers. **Third-year** Distinguishable from adult by lack of clear demarcation between dark breast and pale abdomen.

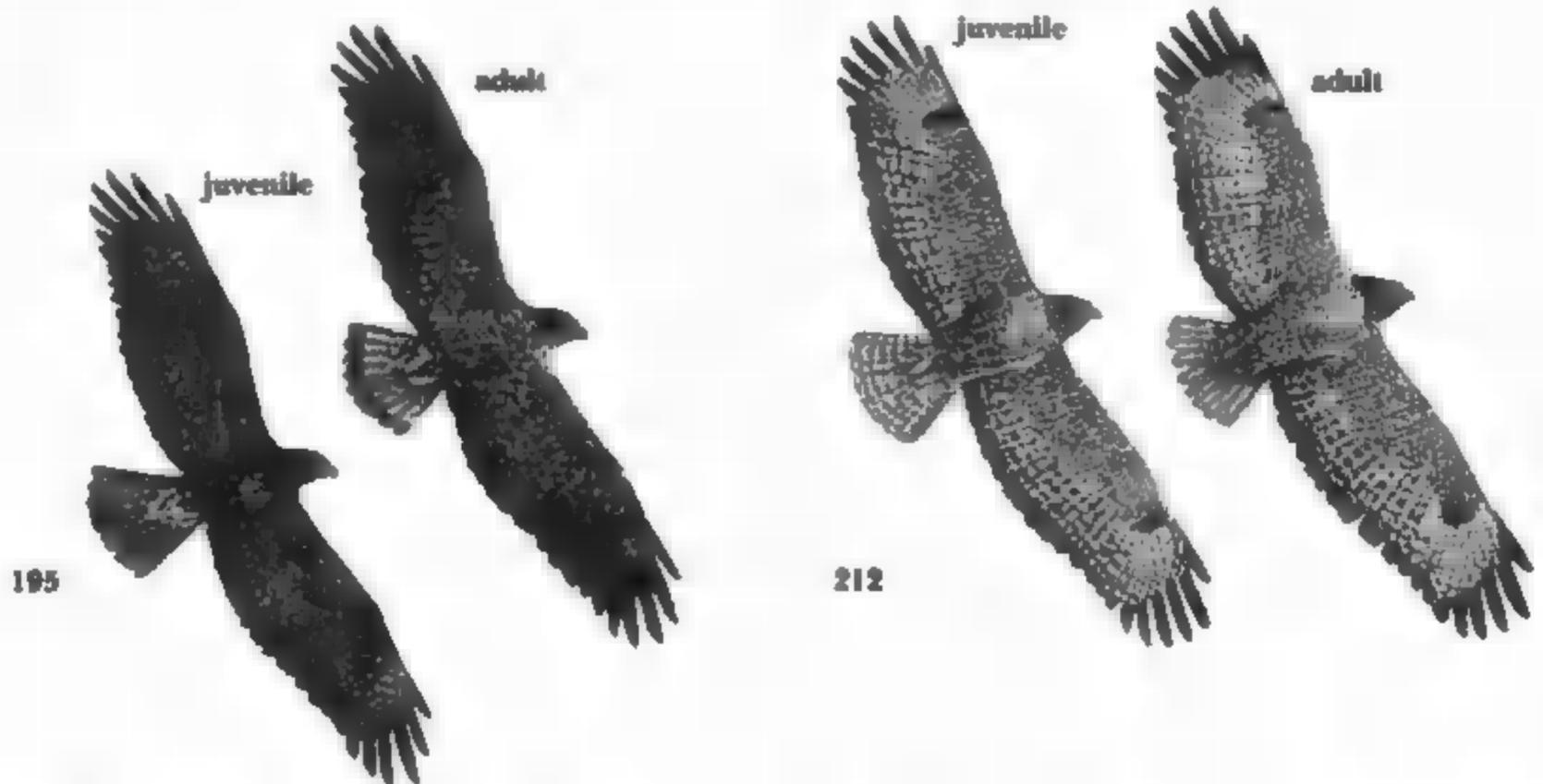
least in the southern half of the range, do not indicate anything like that. If juveniles do sometimes remain with their parents for several years (see Sociosexual Behaviour), it may be that breeding is less than annual and, with a large home range, a single non-breeding pair or family can result in a series of observations over quite a wide area. As in the case of the Black Solitary-eagle [183], the population of this species seems likely to have been overestimated, and it must be very vulnerable. If it does specialise on skunks and armadillos (see Food), which are both crepuscular and have lower densities in the chaco and, more particularly, in the cerrado (see Habitat) than in richer grassland areas elsewhere, that might account for its apparent diurnal lethargy and its small numbers. The spread of agriculture – with concomitant burning, mechanisation and overused dangerous pesticides – and of intensive cattle-ranching, are continuing to degrade and destroy suitable lightly wooded habitats and natural grasslands, not least the Brazilian cerrado, throughout much of this large buteonine's range, and in southeast Brazil forestation of grasslands with eucalyptus and other exotics is further affecting

foraging areas. This species is also hunted (not difficult if so approachable) like other large raptors. Although no real evidence, decrease seems likely and set to continue.

**GEOGRAPHICAL VARIATION** Monotypic. See also Black Solitary-eagle [183], which is sometimes treated as conspecific. Here the two are considered to form a superspecies.

**MEASUREMENTS** ♂ wing 521–545 mm, ♀ 535–566 mm; ♂♀ tail 264–315 mm. **Weights** 2.95 kg.

**REFERENCES** Albuquerque (1986), Amadon (1949), Alvarez (1933), Belton (1984), BirdLife International (2000), Blake (1977), Canavari *et al.* (1991), Chebez (1989), Chebez *et al.* (1998), Collar & Andrew (1988), Collar *et al.* (1992), de la Peña (1977, 1985), Contreras *et al.* (1990), Delhey & Carrete (1999), Gjai (1950, 1952), Gonner & Blendinger (1998), Hayward (1967), Kramer *et al.* (1993), Macdonald (1984), Sarosky & Yaurieta (1993), Parker & Willis (1997), Olrog (1959), Remsen & Traylor (1989), Roth (1985, 1986), Scott & Brooke (1985), Sick (1993), Silveira (1998), Stotz *et al.* (1996), Wege & Long (1995).



**Fig. 42.** Shapes of mainly Neotropical White-tailed Hawks *Buteo albicaudatus* [195] and Afrotropical Angur Buzzards *B. augur* [212], to show how, in most (not all) buteos and buteonines, the juveniles (left in each case) have narrower wings and longer tails than the adults. Many raptors show comparable differences (because of differing lengths of remiges and rectrices at different ages), but, in contrast, the juveniles of some genera have broader wings and shorter tails than the adults; while others have longer or shorter wings (see headings to plates 1–3).

## 185 GREY-LINED HAWK

*Buteo nitidus* (Latham, 1790)

Plate 65

Other names: Grey Hawk, Mexican Goshawk (northern), Shining Buzzard-hawk (southern)

Proposed name: Grey-lined Buzzard

**DISTRIBUTION** Southernmost Nearctic, and Neotropical (34°N to 29°S); order 6; rare or uncommon to locally fairly common or even common, with extensive range. Extreme southern USA, Central and northern South America, mainly within tropics: from south Arizona and Rio Grande valley in southeast Texas (has also

bred New Mexico) patchily through lowland Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica and Panama to Colombia and west Ecuador and, east of Andes, from east Colombia, Venezuela and Guianas through east Ecuador, northeast Peru and much of Brazil (south to Mato Grosso and São Paulo) to north and east Bolivia (Pando to Santa Cruz), Paraguay, and north Argentina (south to Tucumán and northern Santa Fé); also Trinidad (fairly common).

**MOVEMENTS** Populations of Arizona and northwest



Mexico move south October–March; otherwise generally sedentary or dispersive. Occasionally recorded Tobago (from Trinidad?).

**HABITAT** Broken and, especially, gallery and other riverine forest and edges, open woodland, savannah with clumps of trees; thus, wide diversity from wet forest fringes to extensive dry wooded areas, when still preferably near water. Much less in dense humid forest, where favours roadsides or tracks. Sea-level to 800 m, locally to 1,300 m.

**FIELD CHARACTERS** Small, compact accipiter-like buteo, grey and barred as adult, with relatively short wings and longish tail. Perches quietly in canopy or openly on telegraph poles and bare branches; wing-tips only half down tail. Sexes similar but, with some overlap, female averages 4–9% larger (different races) and perhaps up to 20% heavier; juvenile very different; as adult after first moult.

**PERCHED Adult** Above, in north, looks fairly uniform plain slate-grey (actually obscurely barred and black-shafted) with paler head; in south, much paler grey with clear fine dark bars on head, back and wing-coverts (see Geographical Variation); tail black above with narrow white tip, fairly broad median band, and single thin basal bar (or two in central populations, but reduced or even absent in south) which, like white U on uppertail-coverts, often hidden when perched; below, correspondingly varies from all finely grey-barréd white body (cheeks and throat appearing mottled) in north to gleaming white with silver barring and almost plain cheeks, throat and mid-chest in south; always unmarked white crissum. **Northern juvenile** Blackish-brown above, broadly edged rufous; paler brown tail with five to eight narrow dark bars (subterminal widest); creamy supercilia and cheeks contrast with dark eye-stripes and malar stripes; all creamy-white below, with dark brown drop-shaped streaks, barred thighs. **Southern juvenile** Browner above, edged buff; tail broadly banded buff and blackish; whiter head-sides make post-ocular and malar stripes clearer; whiter below with sooty drop-shapes and some buff marks, thighs much less barred or even plain. **Bare parts** Adult eyes dark brown in north, yellow south from Costa Rica; juvenile paler brown. Adult cere and legs lemon-yellow, juvenile brownish-yellow.

**FLIGHT** Smallish raptor with relatively short round-tipped wings, slightly narrowed at base, and longish tail; wingspan 2.1 times total length. Accipiter-like action with series of quick stiff beats interspersed with short glides on level wings; also soars with wings flat. Flicks tail sideways on alighting (cf. Roadside Hawk [186]).

**Adult** Grey above (or barred grey and white on head, back and wing-coverts in south) with contrasting black tail that has white tip, clear median band and usually one thin or broken basal bar, and white U on uppertail-coverts; below, barred body, more lightly barred wing-linings (almost plain white in south), faintly barred flight-feathers with just tips of primaries black or blackish, and banded tail. **Juvenile** Longer-tailed; dark brown above with many light edges, bold strpy pattern on paler head, and tail thinly barred (in north) or more broadly and contrastingly banded (in south) with white U above base; below, creamy-white body and wing-linings variously dark-streaked and blotched, with more or less barred thighs (wing-linings and thighs can be almost plain in south), indistinctly barred flight-feathers (looking greyish-white, but with buff windows at base of primaries in central and southern populations) and more clearly barred or banded tail in shades of grey. (See also fig. 43 on p. 658.)

**CONFUSION SPECIES** Adult almost unmistakable, though northern South American and Caribbean coast adults of Roadside Hawk [186] quite grey above (but plain throat and chest, rufous-barréd abdomen, many other differences), while white median band(s) on black tail shared by various other grey buteonines (see plate 54). Male Hook-billed Kite [15] has comparable size and pattern, but heavier bill, orange and green patches in front of white eyes, broader grey barring below, longer tail, and paddle-shaped wings with dark undersides. Juvenile Grey-lined Hawk has paler head with bolder pattern than most other buteos, but might be mistaken for juvenile Broad-winged Hawk [190] (more pointed wings with darker fingers and trailing edges, blotched or streaked but not barred thighs, few thin dark bars on tail, no white U above base, as well as streaky head without bold lines); or juvenile Roadside, particularly in central South America, where local race *griseocauda* has bold supercilia and comparable tail pattern (but always slighter buff U above base, yellow eyes, streaked bib, bars rather than blotches on underbody, more heavily marked linings, buff instead of rufous primary windows, and more rufous-buff tone below). See also juvenile accipiters [plates 40–51] (similar flight action, but again no white U, generally longer tail, boldly barred undersides to shorter wings, etc.).

**VOICE** In aerial displays, high, clear whistled *pe-yurrrr*, less harsh (and more drawn out) than that of Roadside Hawk [186], less plaintive than Broad-winged Hawk [190]; also descending *keer kee-kee-kee-kee*.

**FOOD** Particularly lizards, some small snakes, and probably mainly young or injured birds; also large insects (grasshoppers, beetles), frogs, and small mammals. Often still-hunts by gliding down from concealed or open perches, but also variously tail-chases low over ground and through trees, pounces from transect-flights, or stoops from higher soaring.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs.

(La Paz, Cochabamba) to northwest Argentina (Jujuy, Salta, Tucumán). Recorded range also extends patchily eastwards through eastern Paraguay, extreme northeast Argentina (Misiones), and south Brazil (northeast Rio Grande do Sul north to Paraná and, at least formerly, eastern Mato Grosso and Minas Gerais); but now generally rare in east of range and may well have largely disappeared there (no recent records from northeast Argentina, for example).



**MOVEMENTS** Usually considered sedentary, but has been recorded in southeast Venezuela and, formerly at least, apparently wandered slightly south of range in northeast Argentina (Corrientes and east Chaco), as well as into adjacent Uruguay; also recorded in September–October in southeast Bolivia (Tarija) probably somewhat dispersive or nomadic.

**HABITAT** Extensive dense humid upland forest, especially clearings and edges, or broken areas on steep mountain slopes; said also to occur in chaco (seasonally flooded grassland with thorny scrub and scattered palms). Mostly 1,500 m to 2,900 m, occasionally to 3,560 m, but in east of range (formerly at least) down to 500 m or lower.

**FIELD CHARACTERS** Small, chunky buteo, mainly black as adult, with rather short wings and medium-length to longish tail. May perch openly on exposed branch, sometimes wagging tail (see Voice), but probably often inconspicuously within canopy; wing-tips only half down tail. Sexes similar but, with some overlap, female averages 6% larger; juvenile distinct.

**PERCHED Adult** All black apart from white on rump (hidden at rest), creamy undertail-coverts, blackish-banded rufous thighs, and greyish median band and whitish tip on tail (but two white bands from below: see 'Flight'). **Juvenile** Browner-black above, streaked sandy-rufous on head and thinly edged rufous on wing-coverts, but rump and tail like adult; basically sandy-rufous below, all heavily streaked with blackish-brown, except for mainly brown thighs barred by thin paler feather-tips, and plain creamy crissum. Variant female described with rusty-chestnut coloration, most noticeable on head and underparts (Navas & Bö). **Bare parts** Adult eyes bright yellow, juvenile yellow. Adult cere orange-yellow, juvenile dull yellow. Adult legs orange-yellow to orange or bright rusty-orange, juvenile yellow.

**FLIGHT** Smallish raptor with rather short round-tipped wings and longish ample tail; wingspan 2.0 times total length. Flight action not described, but frequently soars low, and sometimes high, over forest. **Adult** All black above but for white band on rump, greyish median tail-band (traces of second at sides, nearer base, when fully spread) and whitish tip; below, mainly black or blackish with sharply contrasting white axillaries creamy wing-linings (on which scattered dark spots hardly show but black carpal arcs stand out), as well as rufous thighs, creamy or pure white crissum and two white tail-bands; undersides of flight-feathers mottled or lightly barred with whitish, but look mainly dark (palest at bases of primaries). **Juvenile** Very like adult from above, if browner, apart from streaky head; below, heavily blackish-streaked body looks darker than plainer throat, plain creamy crissum, and lightly marked wing-linings (on which smaller blackish carpal arcs still show up); two-banded tail like adult (usually more obvious white tip), but undersides of flight-feathers much more clearly barred greyish-white and dusky. (See also fig. 44 on p. 661.)

**CONFUSION SPECIES** Contrast of black or heavily streaked body and more or less rufous-banded thighs with much paler creamy wing-linings and crissum prevents confusion with any other buteo, quite apart from bold tail pattern and white rump-band. Dark-morph Broad-winged Hawk [190] has dark wing-linings and silvery flight-feathers.

**VOICE** 'Short whistled scream, sometimes tirelessly repeated on perch as wags tail' (TB Johnson in Hilty & Brown). 'Sometimes tirelessly repeats thin, high-pitched, short *peep* calls' (Fjeldså & Krabbe).

**FOOD** Little information. Known to take reptiles, frogs, small rats, insects; one of the few firm records involved beetles. Probably a still-hunter; but also seen to follow mixed-species bird flocks inside forest, presumably seeking prey items that they disturb (M Pearman).

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Single and mutual circling low over forest, sometimes repeatedly calling, but no other descriptions of aerial displays.

**BREEDING** At least February–March in Colombia, perhaps October onwards in Brazil. No details of nest. Clutch 1–2. Incubation and fledging periods not recorded.

**POPULATION** No real data on which to hazard order of magnitude, but species rather local and perhaps only patchily common over more than 2,000 km of north Andes and associated mountains, and present in pre-montane zone over another 3,000 km, so that population in upper thousands seems likely. Although will accept slightly disturbed forest, seriously threatened at lower altitudes by deforestation.

**GEOGRAPHICAL VARIATION** Monotypic. (One illustration in Brown & Amadon's plate 95, grey-brown above and largely white below, is labelled as the pale morph of this species, but they make no reference to it in the text and there is no evidence of such a bird's existence; it appears to be a pale-morph Short-tailed Hawk [191].)

**MEASUREMENTS** ♂ wing 206–240 mm, ♀ 212–253 mm; ♂♀ tail 136–171 mm, tarsus 52–64 mm. **Weights** ♂ 290 g (one), ♀ 389 g (one).

Falls); adults not uncommonly recorded north of breeding range, in south Manitoba. Intriguingly, this species reported on passage since 1997 in central Guatemala, farther south than any other records, but no details available and not known whether northern migratory populations or more sedentary southern ones involved. Vagrants recorded east to Bermuda, but reports of juveniles riding ships to Britain considered more likely to have involved juvenile Broad-winged Hawks [190].

**HABITAT** Well-watered woodland and edges preferred. In eastern range, favours alluvial woodland, including swampland and riverine and streamside forest, and in central and southern Florida small woods surrounded by large areas of wet grassland. Isolated western population generally inhabits semi-humid woodland with oak and eucalyptus, extending locally into more arid riparian woodland, and even into urban areas. In colder parts of winter range, as watercourses freeze, often moves into more open habitats with scattered trees and hedgerows. Sea-level to 1,000 m, and to 2,500 m in winter and on migration.

**FIELD CHARACTERS** Mid-sized to largish, slender buteo, rather variable but most adult plumages dark brown, black and rufous distinctively barred on wings, tail and underparts, with rather small bill on small head, longish tail, fairly long legs. Perches upright and frequently well concealed at middle level or lower in tree within forest or wood (in winter often at edge), but in west and southeast USA and Mexico often more openly on pole, fence post or, unlike other Nearctic buteos except Broad-winged Hawk [190], on wire; wing-tips somewhat short of tail-tip. Sexes alike, but female averages 6% larger and 13% heavier; juvenile distinct; as adult after first moult, and first breeds usually at two years, some females possibly at one year.

**PERCHED Typical eastern adult** Dark brown above, head streaked tawny and with darker moustaches, upperparts edged rufous and thinly creamy rufous patch on lesser wing-coverts (red shoulders), black secondaries and primaries prominently barred white, and black tail with three to four widely spaced narrow white bars and thin white tip; apart from streaked whitish chin and plain white crissum, underparts narrowly barred whitish on rufous, with rather sparse but well-defined thin blackish streaks on breast, and streaks or blobs on belly and flanks, dark markings being most pronounced on females and occasionally lacking on males (from Oklahoma/Texas across to South Carolina/central Florida, the races *alleni* and, on average, brighter *texanus* both unstreaked below; see Geographical Variation). **South Florida adult (*extimus*)** Pattern similar, but much paler and greyer all over; whitish to greyish head, light rufous shoulders well contrasted against grey upperparts, and pale rufous barring on underparts with few, if any, breast-streaks. **Western adult (*elegans*)** Brighter than others, most noticeably having solidly rufous shoulders and, below, uniformly bright rufous breast with few sparse dark pencil-streaks; remaining underparts clearly barred rufous and white; three (sometimes four) visible white tail-bands rather broader than in other races. **Typical eastern juvenile** Dark brown head variably pale-streaked and with buff to whitish supercilia, pale lower ear-coverts, dark moustaches; darker upperparts mottled tawny-rufous and whitish to buff, often with hint of red

shoulders; pale spots on secondaries form three pale bands below wing-coverts, while rufous-based dark brown uppertail has numerous (seven to eight) narrow buffy bands; whitish-buff underparts heavily marked with broad streaks and blobs (southern races, except in south Florida, more arrowhead-marked, sometimes looking dark-banded). **South Florida juvenile (*extimus*)** Generally paler, crown often well streaked, and often no rufous at tail-base; below, thinly but extensively streaked dark brown with few scattered spots, but markings typically heaviest on breast (can form bib), and frequently small arrowheads on trousers (but many inseparable from juveniles of *alleni* to north). **Western juvenile (*elegans*)** Differs from juveniles elsewhere in range in being generally more adult-like, with much rufous; rufous head and shoulders stand out from browner wing-coverts (buff-mottled) and blackish-brown flight-feathers (strongly barred) and uppertail, latter with usually three to four narrow white bars; buff to creamy underparts streaked dark brown on throat (often dark median stripe) and chest, with rufous-buff drops and bars on belly, flanks and crissum. **Bare parts** Adult eyes dark brown, juvenile pale to medium brown to grey-brown. Cere yellow. Legs yellow to orange-yellow.

**FLIGHT** Medium-sized raptor with moderately projecting but rather small head, long and fairly broad round-tipped wings showing five short fingers, and long round-ended tail; wingspan 2.4 times total length. Accipiter-like flight, with few (three to five) fast shallow beats of somewhat cupped, stiff wings followed by brief glide on bowed wings with tips lowered, tail often partly or fully spread in glide; soars on flat wings pressed forward, sometimes with slight dihedral; does not hover. **Typical eastern adult** Above, largely brown-looking, with variably obvious rufous on inner forewings, except for strikingly bold white spot-bars creating chequered pattern on black flight-feathers (most marked on secondaries) with, diagnostically, white arc across outer-primary bases, while black tail normally shows three to four widely spaced narrow white bars and thin white tip; below, apart from usually plain pale crissum, distinctive pattern of whitish-banded pale to brighter rufous body (with dark-streaked breast, dark-streaked/blotched belly and flanks, except in southern races; see Geographical Variation) and lighter rufous wing-linings against whitish flight-feathers barred black with broader black trailing edges and tips, which (when backlit) show diagnostic crescent-shaped whitish primary-panels; black undertail with three to four well-spaced narrow pale bands and thin terminal. **South Florida adult (*extimus*)** Much paler and greyer above, with grey to whitish head and greyer back and wing-coverts, though still rufous shoulders, and contrastingly blacker ground colour on chequered flight-feathers and barred tail (two to three white bars); below, pattern much as typical eastern adult but paler-looking on body and linings, which are whitish to pale grey with pale rufous bars (may appear all light buffish), plainer on throat, and white on crissum. **Western adult (*elegans*)** Wing and tail patterns, both above and below, basically as other races, if white tail-bars (three, sometimes four) a little broader than theirs, but plumage distinctively brighter, more richly coloured; solidly rufous shoulders and bright rufous breast looking unmarked, while lower breast to flanks and belly, as well as wing-linings, fairly closely barred rufous and white.

**Typical eastern juvenile** Variably pale-streaked brown head with, at closer ranges, pale supercilia and lower ear-coverts, and dark moustaches; otherwise, dark brown above strongly marked with tawny-rufous and whitish buff mottling, and hint of red shoulders; flight-feathers show symmetrical pale tawny buff spots (less striking than adult pattern) and, more importantly, often prominent buff to pale tawny crescent across outer primaries, while pale C on rump contrasts rufous-based dark uppertail that has seven to eight narrow buffy bands; below, whitish to creamy body streaked/blotched dark, and linings similar or, more often, less patterned (southern races apart from *extimus* look more barred than streaked below, with arrowheads), but flight-feathers and tail pale greyish and heavily and regularly barred, wings showing dusky trailing edges and wing-ends broadly blackish outside pale crescent across outer-primary bases. **South Florida juvenile (*extimus*)** Paler-looking, though still generally brown above, and with similar if not more strongly barred remiges, though more likely to lack rufous at base of tail; below, body lightly streaked dark brown, markings typically heaviest on breast (often appears bibbed) and with few other spots sometimes visible (e.g. small arrowheads on trousers), while underwings and undertail much as other races; many less-patterned individuals, however, inseparable from juvenile *allem*. **Western juvenile (*elegans*)** Closer to adult in appearance: above, mostly rufous head and shoulders, prominently barred blackish-brown flight-feathers, with whitish arcs across outer primaries, and blackish tail with three or more narrow whitish bars; creamy to buff underbody frequently with dark median throat-stripe, streaks dark brown, on chest, rufous-buff bars/drops from lower breast to crissum, and, often, more solidly rufous linings contrasting boldly barred remiges; outer primaries crossed by pale crescent-shaped panel, and dark tail showing two to three thin pale bars and pale tip.

**CONFUSION SPECIES** At all ages, should be identifiable by diagnostic pale crescent-shaped primary-panels on upperwings and on backlit underwings. Otherwise, adult in flight likely to be confused only with two other rufous-bodied raptors: adult Broad-winged Hawk [190], which is rather similar in shape but has only two white bands (one broad, inner one narrow) on black tail and whitish, not rufous, wing-linings (though beware that some have tawny-rufous linings); and juvenile Northern Harrier [94], which has dark undersecondaries, axillaries and greater coverts forming dark patch on underwings (as well as proportionately longer and narrower wings and tail, facial disc, streaked underbody, V-held wings); both lack white crescent-shaped wing-panels, and their upperwings lack prominent pale barring across the flight-feathers. Perched juvenile can be difficult to separate from juvenile Broad-winged, and latter best identified by shorter legs, light brown uppertail with dark bars (reverse of Red-shouldered pattern) and absence of pale spots on edges of secondaries; juvenile in flight also similar to young Broad-winged, which, however, is smaller with more pointed wing-tips, and square (not arc-shaped) pale windows on backlit underwings. See also Northern Goshawk [155].

**VOICE** Relatively noisy. Common call, used both for territorial purposes and in other contexts, is screamed *kee-aanh*, *kyeraph*, *kyeah* or similar, first syllable accented

and second drawn out and descending, usually repeated rapidly up to four times or in longer series, often persistently. Few other calls reported include single or repeated *kip* by male bringing prey to nest, female responding similarly, and occasional plaintive *keew-eee*.

**FOOD** Wide variety of, mainly, reptiles, amphibians, small mammals and insects, with fewer birds, crayfish and fish; carrion rarely taken. Reptiles mostly snakes of moderate size, but also small lizards and some young turtles. Amphibians include frogs and others, up to size of bullfrog. Among mammals shrews often figure prominently, with others up to size of chipmunk less frequent. Usually few birds, these including nestlings, but in size ranging up to adult grackle *Quiscalus*; some waterfowl recorded, perhaps caught when injured, or taken as carrion. Insects sometimes in considerable numbers, mostly large orthopterans. Other prey items, such as crabs, fish, centipedes, earthworms and snails, normally only casually taken, probably opportunistically. Commonly still-hunts, often near water, taking prey on ground, or at or just below water surface, after short downward glide from perch; but also forages aerially, at times or locally more frequently than from perch, using low leisurely flight to surprise victim at close quarters, this method often quite successful with slow-moving prey; unlike many other buteos, does not hover. Occasionally forages on ground, especially on river banks and along streams. No reports of piracy of other raptors.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs, and usually recorded singly on passage at raptor watchpoints. Frequent aerial displays include undulating flight and conspicuous mutual high-circling, accompanied by loud calling (see Voice), sometimes with one of pair swooping at other. In sky-dance, presumed male soars up and then enters steep plunge on half-closed wings before checking and, after spiralling, shooting upward again, repeating process several times, in densely occupied areas, several pairs may display simultaneously (up to 10+ birds recorded in air together). Cartwheeling almost always involves territorial male expelling intruding male.

**BREEDING** April/May–July in northern range, from March elsewhere, but in California and parts of southernmost USA January/February–August/September. Large stick nest, lined with greenery, 5–35 m up but well below crown in main fork of usually deciduous tree in large stand, less often in conifer, and frequently close to water, but in southern California also in eucalyptus and in south Florida sometimes palmetto; since 1996, in southwest Ohio, also on roof of occupied building. Clutch 2–5, but 2–4 in Mexico and 2–5 in Texas and Florida. Incubation c33 days. Fledging c45 days; dependence 8–10 weeks.

**POPULATION** This species appears to be reasonably common throughout its range, if somewhat local in wetter forest over much of eastern North America, and numerous and more conspicuous in Florida; western race *elegans*, previously considered only rather locally common in western California, has since mid 1990s greatly expanded its range along west coast of USA to reach north Washington, while in Mexico's Baja California it is regarded as fairly common to uncommon. No published population estimates, but rather extensive range, which must cover at least 4 million km<sup>2</sup>, even

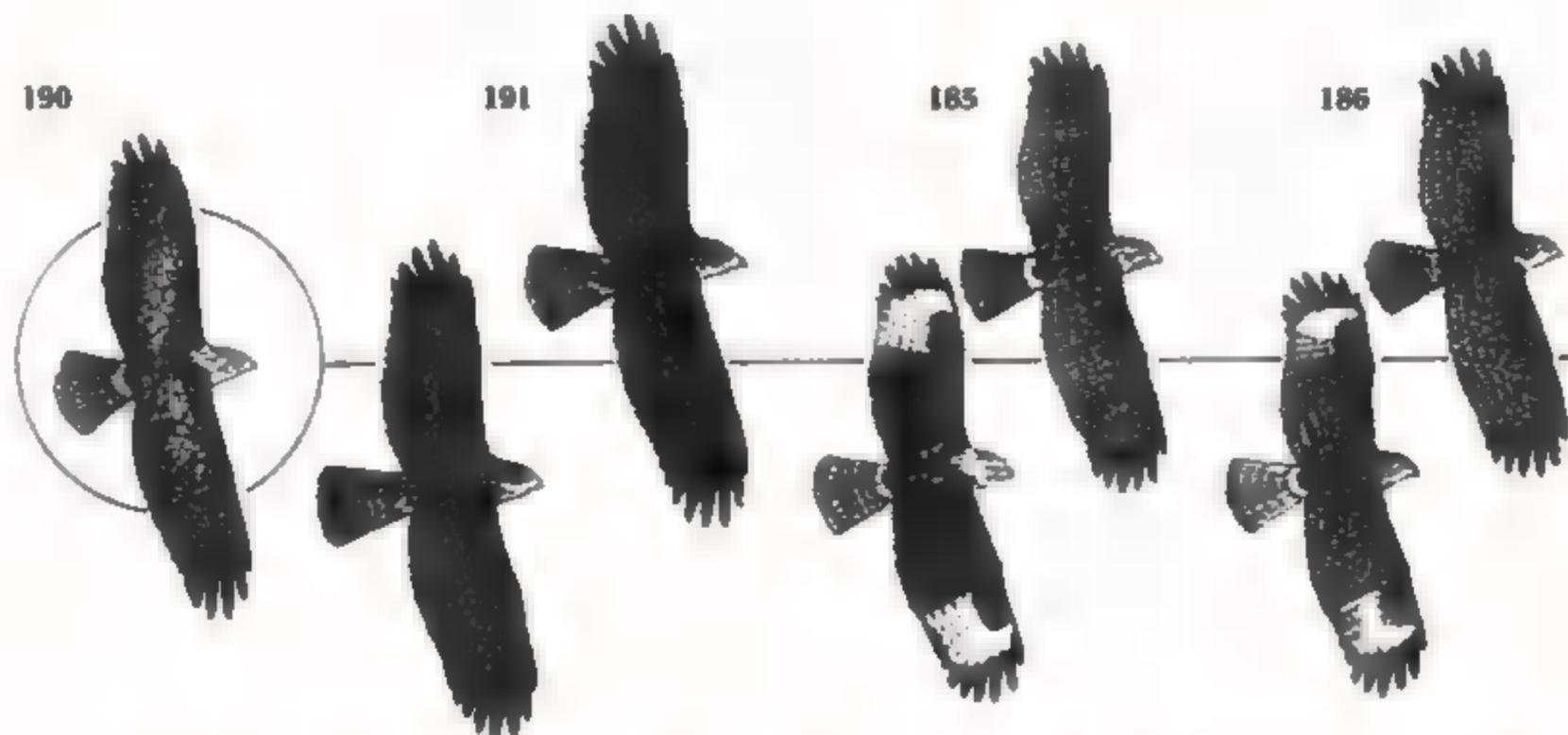


Fig. 43. Flight comparisons from above of juveniles of four species of small New World buteos, the first of which (circled) mostly breeds in North America and winters in South, while the other three are much more sedentary and represented by different races in Nearctic region (above line) and Neotropical (below line). Broad-winged Hawk *Buteo platypterus* [190]: juvenile all dark brown above but for lighter streaky head, pale mottling on wing- and tail-coverts, and lighter brown tail thinly barred with uneven space behind usually broader subterminal. Short-tailed Hawk *B. brachyurus* [191]: juvenile uniformly dark brown, including crown and wings, but for greyer and obscurely dark-banded tail; little difference between the two races except that nominate *brachyurus* in South America may have darker subterminal band than *fuliginosus* in Florida and Mexico. The right-hand two species show much greater difference between the juveniles of the two races. Grey-lined Hawk *B. nitidus* [185]: juvenile of the southernmost race *pallidus* (south Brazil to north Argentina) has more contrasting pale head and wing-windows, while the northernmost *plagiatus* (Florida) is more uniform despite its still striking face pattern and the white U above the base of its evenly barred tail with broader subterminal band (the North/Central and South American populations are sometimes treated as distinct species). Roadside Hawk *B. magnirostris* [186]: juvenile of southern *satrapus* (Bolivia to west Argentina) is again contrasted above with wing-windows and pale, clearly banded tail, while the North/Central American *griseicauda* is relatively uniform. [For undersides, see plates 65, 63, 65, 61.]

three visible thin tail-bars that are also whiter above and, in flight, looks quite different with wing-linings rufous (Lesser Antillean races of Broad-winged also have rufous-lined linings; see Geographical Variation), and flight-feathers chequered above, greyer and more strongly barred below, and showing crescent-shaped primary-windows; juvenile has tail pattern reversed from Broad-winged's – dark with light bars – and, in flight, more barred underwings with much clearer crescent-shaped (not squarish) primary-windows. **Juvenile pale-morph** Broad-winged is also comparable to juvenile Grey-lined Hawk [185] (bold dark head pattern with contrasting white supercilia, cheeks and throat, different tail pattern with widening bands, white U on rump, more rounded wing-tips, no dark trailing edges and, less so in South America, barred thighs); if little streaked below, to juvenile pale-morph Short-tailed Hawk [191] (solid dark cheeks, wing-tips reach tail-tip, two-tone underwings, less distinct subterminal tail-band); if in Andes, and rather more marked below, to juvenile White-throated Hawk [192] (dark cheeks contrasting extensive plain throat, more heavily marked flanks, greyer secondaries, more finely barred tail); and even to juvenile Roadside Hawk [186] (rounded wings, accipiter-like action, bowed glides, longer tail with equal barring, barred lower underparts, pale eyes) and juvenile Red-tailed Hawk [202] (larger and very variable and, despite squarish primary-windows like Broad-winged, pale morphs recognisable in flight by more or less well-defined dusky strip or patch on underside of inner forewings). See also – especially juveniles

– Double-toothed Kite [31], Cooper's Hawk [149], Northern Goshawk [153]. Rare dark morph needs to be separated by patterns of tail and flight-leathers from other blackish buteos, of which only the clearly larger Swainson's Hawk [198] – which has much darker remiges and pale crissum – and the similar-sized but differently proportioned Short-tailed (both much commoner than dark-morph Broad-winged) have similarly pointed wings; tail pattern resembles Zone-tailed Hawk's [199], but that has long slender wings raised in tilting V when sailing.

**VOICE** High, thin plaintive whistle or shrill squeal, long-drawn and more or less disyllabic, variously written as *tuuu-oh*, *seeeee* or *ssiiiiiu*, *k'rrrrrrrrrr*, *puu* or *kuu-uu-uu-uu*, and so on.

**FOOD** Small mammals, reptiles, amphibians, large insects (e.g. saturnid moth caterpillars, grasshoppers, dragonflies) and other arthropods (e.g. crustaceans, earthworms), some birds. Mammals range from mice to small rabbits; many snakes and frogs taken; 25+ species of bird recorded as prey, to size of small game-birds (e.g. Tetraoninae, Odontophorinae), but some at least sick or injured, also at times many nestlings and nidifugous young. Mainly still-hunts from low branch or other fairly concealed perch by clearing or water; but in winter quarters, when may feed to greater extent on invertebrates, often more in open, on telegraph pole, power line or similar vantage point. Also perch-hunts through woodland, and sometimes forages in flight. Insects may be eaten on wing.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs except on migration, when flocks of tens, hundreds or even thousands, sometimes with Swainson's Hawks [193] or Turkey Vultures [2]; winters singly, apparently in individual territories. Single and mutual high-circling frequent in breeding season, with much calling, sometimes one of pair swooping at other; also horizontal rollercoaster dance and descending series of dives.

**BREEDING** March–July (August). Rough stick nest (sometimes based on old nest of other raptor, crow or squirrel), lined with flakes of bark and leaves of oak or pine, usually at 6–14 m (1–30 m) in first main crotch of broadleaf or conifer. Clutch 2–3 (2–4). Incubation 28–31 days. Fledging 39–41 days.

**POPULATION** Numbers on several Caribbean islands seriously affected by deforestation, other habitat disturbance and, at least in Cuba and Puerto Rico, unrestricted shooting: surveys on Puerto Rico in 1980s showed only c124 birds, and that island's endemic race is clearly at risk. But North American breeding range takes in some 4.3 million km<sup>2</sup>, and the species remains common in well-wooded areas with no indications of significant changes over past 40 years. Six-figure breeding population would be achieved by average density of only 1 pair/86 km<sup>2</sup>, and seven figures by 1 pair/8.6 km<sup>2</sup>. Latter is probably too high, though one estimate put North American total at over 1 million. Numbers seen on migration also give some guide to population size. As many as 100,000 have been estimated on peak day in east Mexico, and flocks of hundreds or thousands often noted at many points along Caribbean slope of Central America, but greatest concentrations at narrows of Isthmus of Panama: there, in September–November 1970–82, highest day count was 143,540 and highest autumn total 401,270 (see Smith 1985, who counted on film, having found that 'estimates' generally proved gross exaggerations). In autumn, these totals will have included many juveniles, but they represented only the 'visible' flocks (including some invisible through 10 x 40 binoculars) and could not allow for those hidden by cloud or flying too high to be picked up at all.

**GEOGRAPHICAL VARIATION** Six races: mainland dimorphic, but dark morph rare; other five Caribbean insular, most smaller and shorter-winged, all apparently showing less RSD.

*B. p. platypterus* (North America, wintering to South) As described under Field Characters.

*B. p. cubanensis* (Cuba) Adult streaky below, more like immature of North American race.

*B. p. brunnescens* (Puerto Rico) Like *cubanensis*, but darker, blacker-streaked.

*B. p. insulicola* (Antigua) Smallest and palest; paler brown above, edged still paler; whiter below with clearer throat, lighter breast-streaks and flank-bars.

*B. p. rivierei* (Dominica, Martinique, St Lucia) Second smallest but darker again; streaked throat, more rufous breast and rufous-tinged wing-linings.

*B. p. antillarum* (St Vincent, Grenadines, Grenada, Tobago, Little Tobago) Like *rivierei*, but larger and slightly paler.

**MEASUREMENTS** *B. p. platypterus* ♂ wing 244–277 mm, ♀ 265–296 mm; ♂ tail 148–174 mm, ♀ 155–185 mm; ♂♀ tarsus 56–66 mm. *B. p. cubanensis* ♂ wing 250–256 mm (two), ♀ 254–266 mm (three). *B. p. brunnescens* ♀ wing 265 mm (one). *B. p. insulicola* ♂ wing 227 mm (one). *B. p. rivierei* ♂ wing 245 mm (one), ♀ 250 mm (one). *B. p. antillarum* ♂ wing c260 mm, ♀ c267 mm. **Weights** *B. p. platypterus* 308–483 g, 265–560 g (HBW), ♂ averaging 420 g (14), ♀ 490 g (13) (B&A).

**REFERENCES** Baughman (1947), Hednart *et al.* (1990), Biaggi (1985), Blake (1977), Bond (1979), Burns (1911), Clark & Wheeler (1987), Crocoll & Parker (1989), Friedmann (1950), Heintzelmann (1975), Hilty & Brown (1986), Howell & Webb (1995), Janik & Mosher (1982), Johnson (1990), Johnson & Peeters (1963), Keran (1978), Kerlinger (1979), King (1978/79), Lyons & Mosher (1982), Matray (1974), Meyer de Schauensee & Phelps (1978), Mosher & Matray (1974), Palmer (1988), Ridgely & Gwynne (1989), Peck & James (1983), Rosenfield (1978, 1984), Rosenfield *et al.* (1984), Rowlett (1980), Rusch & Doerr (1972), Schumacher-Donoghue (1978), Sick (1993), Slud (1964), Smith (1980, 1985), Snyder & Snyder (1991), Snyder & Wiley (1976), Stiles & Skutch (1989), Thuillay (1980a), Titus & Mosher (1981), Wheeler & Clark (1995), Wiley (1985, 1986a/b).

## 191 SHORT-TAILED HAWK *Buteo brachyurus* Vieillot, 1816

Plate 63

Proposed name: Short-tailed buzzard

**DISTRIBUTION** Neotropical and, marginally, Nearctic (24°N, with outpost at 25–30°N, to 28°S); order 5?; rare or uncommon to locally fairly common, with wide distribution. Extreme southeast USA, and Central and South America, mainly within tropics: peninsular Florida, and from Mexico (central Sinaloa and central Tamaulipas to Chiapas and Yucatán Peninsula) through Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica and Panama to west Colombia and subtropical west Ecuador (rare); and, east of Andes, from east Colombia (very local?), Venezuela and Guianas through east Ecuador, east Peru, north and east Bolivia (Pando to Santa Cruz) and much of Brazil to Paraguay, and northern Argentina (south to Tucumán and northern

Corrientes); also Isla de Cozumel (off Yucatán), and Trinidad (fairly common) with nearby Chacachacare (one breeding record) and Patos.

**MOVEMENTS** Generally sedentary or dispersive, but northern race partially migratory. Florida population winters in southern third of that peninsula. Also migrants occur in flocks of other hawks in Caribbean lowlands of southeast Mexico, Honduras and Costa Rica, though not Panama, August–October and February–April, some staying through winter. One observation on Tobago.

**HABITAT** East of Andes, tall humid forest and forest edge, especially near lakes, marshes, wet grassland or other partially open areas; also forest of Paraná pine

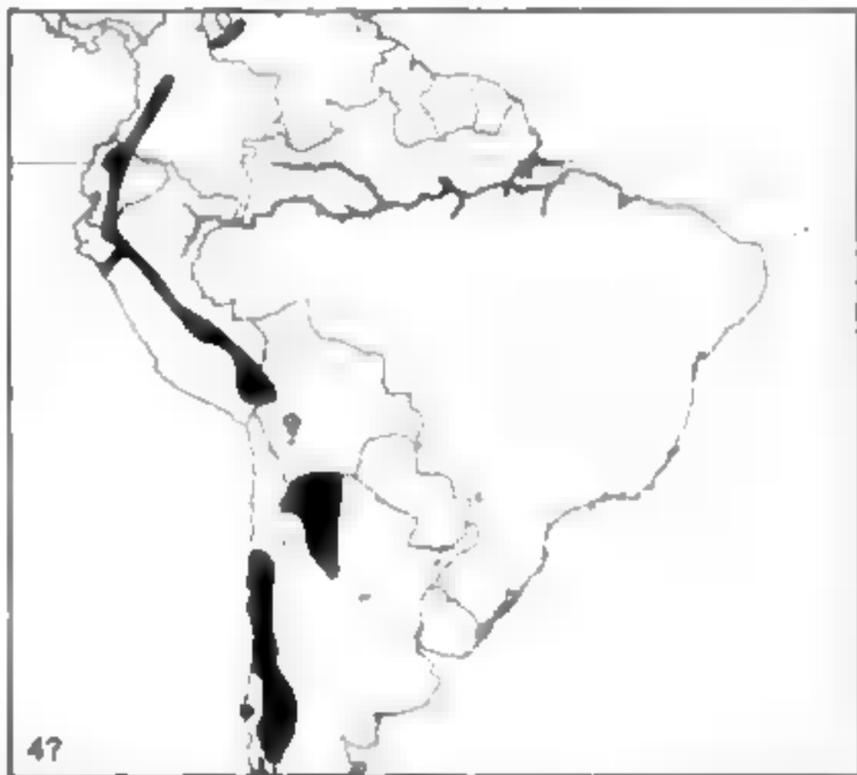


## 192 WHITE-THROATED HAWK *Buteo albigula* Philippi, 1899

Plate 63

Proposed name: White-throated Buzzard

**DISTRIBUTION** Neotropical (10°N to 46°S); order 4?; despite extensive distribution, largely restricted to higher altitudes, generally very local and often rare, but evidently much more numerous in the southernmost section of its range than anywhere else. Mountains of northwest Venezuela (Cordillera de Mérida, perhaps also east to southeast Bolívar) down length of Andes through west and central Colombia, Ecuador and Peru to west Bolivia and, after an apparent gap, also in central Chile (Atacama to Valdivia) and west-central Argentina (west Neuquén south to west Chubut).



**MOVEMENTS** Perhaps rather sedentary, apart from altitudinal movements and some dispersal, which may be cause of occasional reports down to sea-level in Peru and Chile. There are a few isolated records, including one immature specimen, from northwest Argentina (Jujuy, Salta and Tucumán), but the origins of these are unclear. Status in uplands of east Venezuela (southeast Bolívar) also unclear.

**HABITAT** Over much of range, essentially high humid montane forest with adjacent open areas, inhabiting cloud forest and other dwarf or stunted growth and sometimes extending to bleak puna, but in Patagonia also damp wooded foothills of monkey-puzzle *Araucaria* and southern beech *Nothofagus*; has adapted to planted eucalyptus in Ecuador. Typically at 2,500–3,500 m in high Andes, but locally down to 1,700–1,900 m, as in west Colombia, and even at 1,000–2,000 m in Patagonia (where no competition from Short-tailed Hawk [191]); apparently also occasionally to sea-level in Peru and central Chile (but see Movements and Confusion Species).

**FIELD CHARACTERS** Smallish buteo, mainly black-brown and whitish, resembling Short-tailed Hawk [191] and with similarly longish wings but also significantly longer tail (especially sex for sex and in comparison with typical Short-tailed in South America). Little known; when perched, wing-tips short of tail-tip. Possibly dimorphic (though existence of dark morph unconfirmed).

Sexes similar, but female 2–20% larger; juvenile also similar, but distinguishable.

**PERCHED Adult** Black-brown above, including cheeks, which thus give hooded look set off by whitish forehead and loreal spot; browner tail with obscure thin black bars; basically white below, but dark rufous-chestnut at sides of neck and chest, and elsewhere variably streaked with chestnut to dark brown, most strongly (and often only) on breast-sides and flanks, where these markings coalesce into solid dark patch above rufous-banded thighs. **Juvenile** Not unlike adult, but blackish-brown upperparts thinly edged buff to rufous, especially on wing-coverts, and somewhat streaked, most noticeably on cheeks; tail still more finely barred; more creamy-buff below (richest on thighs, which barred blackish-brown) with scattered bold blackish streaks and blotches, particularly on breast and flanks. **[Dark morph** Rare occurrence mentioned (e.g. Meyer de Schauensee & Phelps), 'suspected' (Fjeldså & Krabbe), and immature illustrated (Weick), but not confirmed or properly described.] **Bare parts** Adult eyes brown, juvenile paler (?). Cere and legs yellow.

**FLIGHT** Smallish chunky raptor with long wings and medium-length tail; wingspan less than 2.2 times total length. Stiff beats; sometimes soars high, but wing angles in gliding and soaring not recorded; hovering not described. **Adult** Looks hooded and uniformly dark above, though tail browner with obscure thin blackish bars and slightly wider subterminal; below, white underbody strongly marked with chestnut to dark brown streaks on breast-sides and flanks, which, with the hood, give effect of narrow white throat and white central body enclosed by dark cheeks, breast-sides and usually obvious solid patch above barred thighs; there may be thinner streaks on central underbody, even forming necklace across chest, and to lesser extent on wing-linings, but hood and flank pattern dominant; otherwise wing-linings and underbody paler than thinly dusky-banded greyish quills, with marginally broader dark subterminal tail-band and trailing edges to secondaries; whitish bases to outer primaries contrast with blacker tips and slight dusky carpal arcs. **Juvenile** Differs from adult in somewhat pale-streaked cheeks (still 'hooded'), and in more buff and more generally dark-streaked underbody and wing-linings (still some concentration on chest-sides and flanks, but this less obvious).

**CONFUSION SPECIES** Proportioned like Short-tailed Hawk [191] apart from longer tail, but that easily distinguished in pale-morph plumages by lack of extensive streaking or solid patches on breast-sides and flanks, adult also by more banded tail with broader subterminal and dark trailing edge to secondaries, juvenile also by much plainer wing-linings; Short-tailed also mainly below 1,800 m. In fact, pattern of adult White-throated distinctive enough, but juvenile needs to be separated from pale-morph juveniles of Red-backed Hawk [196] (larger, longer-winged, relatively shorter-tailed, no hood, more uniformly marked underparts, less clear carpal arcs, wing-tips exceed tail at rest, usually found at lower altitudes) and Gurney's Hawk [198] (like Red-backed,

but bigger still, broader-winged, more boldly marked). Also, during northern winter, from pale-morph juveniles of Broad-winged [190] (no hood, more uniformly streaked underbody, pale underwings, clearer subterminal tail-band) and Swainson's [193] (again larger, hooded only when adult, strikingly two-tone underwings with no white at base of primaries, glides and soars on V wings, and wing-tips reach tail-tip at rest); these last two species also have more pointed, less round-tipped wings. See also juvenile Rufous-tailed Hawk [201]. [If dark-morph White-throated exists, may be difficult to distinguish in field from dark-morph Short-tailed, which see for discussion of other species.]

**VOICE** Often silent. In breeding season utters shrill *ke-ah* (M Pearman) and, near nest, high squealing *ke-ee* falling in pitch after first syllable (Fjeldså & Krabbe).

**FOOD** Said to be mainly rodents and birds, but far less known than diet of Short-tailed Hawk [191]. Significantly longer tail indicates hunting techniques may differ, perhaps with little hovering and more low transects, but these not studied.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Single and mutual circling, both low and high, the only recorded displays.

**BREEDING** Seen strongly defending territory in Arauco, Chile, in February, but nesting season must differ

greatly between Venezuela and Patagonia. Said to nest 'on cliffs or in shrub'.

**POPULATION** Although scattered along more than 7,000 km of Andes, breeding range appears to include gap of over 1,000 km in southwest Bolivia, northwest Argentina and north Chile. On the borders of east-central Chile and west-central Argentina (see Distribution) the species is at least 'uncommon to fairly common' (M Pearman), but everywhere else it is evidently rare and local, even if, like Short-tailed Hawk [191], probably overlooked. Too little known for any realistic conclusion about numbers, but probably unwise to expect population to exceed four figures.

**GEOGRAPHICAL VARIATION** Monotypic; rare dark morph suspected. Often considered conspecific with Short-tailed Hawk [191], partly because allopatric northern race of that species somewhat intermediate in character, but ranges apparently overlap with no intergradation. White-throated seems better treated as high-altitude and southern allospecies.

**MEASUREMENTS** ♂ wing 272–287 mm, ♀ 293–327 mm; ♂ tail 157–177 mm, ♀ 168–195 mm. **Weights** No data.

**REFERENCES** Blake (1977), Clark & Wheeler (1987), de la Peña (1992), Fjeldså & Krabbe (1990), Hilty & Brown (1986), Johnson (1965), Lehmann & Hafner (1960), Olrog (1985), Meyer de Schauensee & Phelps (1978), Stresemann (1959a).

## 193 SWAINSON'S HAWK

*Buteo swainsoni* Bonaparte, 1838

Plate 66

Proposed name: Swainson's Buzzard

**DISTRIBUTION** Nearctic in summer (locally to 68°N, but mainly from 56°N to 25°N) and, in northern winter, almost entirely Neotropical (chiefly 22°S to 41°S) but also very locally Nearctic (mainly 25–26°N); order 6; fairly common to common in breeding and winter ranges, and at times abundant on passage through southern Great Plains and Central America, but migrants uncommon to rare everywhere else. Breeds western Canada, western USA and north Mexico: mainly from southern British Columbia and central Alberta, Saskatchewan and Manitoba - also much less commonly in eastern Alaska, Inuvik and south Yukon - south to California, Arizona, New Mexico and western Texas onwards, in Mexico, to Sonora, Durango and Coahuila, possibly Nuevo Leon (formerly Baja California, too); also in west and south Minnesota, north Iowa and, very locally, northwest Illinois and southwest Wisconsin.

**MOVEMENTS** Highly migratory, almost entire population spending northern winter in South America, soaring slowly south at perhaps 25–40 km/h during August–early November (stragglers to early December) and moving back in late February–April: big flocks (see Sociosexual Behaviour) gather in autumn around 28–31°N in area of USA-Mexico border and plains to north (and break up in the same general region in spring). Majority travel high through Mexico (not Yucatán Peninsula) and Central America (not certainly Belize) and then apparently remain on rather narrow front from



Colombia (rare even in Venezuela) southeastwards. They winter mainly in northern and eastern Argentina (south to Buenos Aires province and northern Río Negro) along with, to varying extents, neighbouring southeast Bolivia, Paraguay, southeast Brazil and Uruguay. Many must fly at least 10,000 km, and central

Alberta to eastern Argentina is some 12,000 km, while those from eastern Alaska could be travelling nearly 14,000 km; the journey may take 40–50 days or more. In east Mexico, total of 400,000 passed over Veracruz in one recent autumn. In Panama, largest numbers pass through during three to four weeks from mid October; at Isthmus usually 200,000+ counted each autumn, up to maximum of over 344,000, with peak day total of 43,000+; smaller but comparable numbers pass north in spring, moving through Panama and Costa Rica between end February and early May. Of interest in connection with the return migration is record of estimated 10–13,000 moving north in Santa Cruz department, Bolivia, on 12 March 1993 (M Pearman). Stragglers winter rarely to uncommonly in Mexico (mainly Pacific slope), Costa Rica, Panama, Colombia, Ecuador, east Peru and central Bolivia, but, much farther north, regular winter population (up to 300) has built up in south Florida and individuals are also recorded uncommonly, but increasingly, in south Texas, south California and elsewhere. (Those wintering in Florida and Panama tend to be mostly juveniles, which suggested to Smith 'that inexperience might be a factor in failure to obtain sufficient fat reserves', but juveniles and immatures often form significant proportions of southernmost flocks in Argentina. Indeed, they have sometimes appeared to be in the majority in groups of 10 to 500 in southern parts of Buenos Aires province in December–January (JF-L.), which might even suggest that dispersal could actually be greatest in first and second years; on the other hand, Woodbridge *et al.* found that pale-morph adults predominated in a winter population estimated at 20,000 in the northern part of neighbouring La Pampa in January–February 1995. Species is seldom seen east of Andes from Colombia southwards until arrival in winter quarters and, although odd migrants have reached as far east as Trinidad and Tobago, and east-central Brazil, there are very few records for the whole northern and eastern third of South America north of southeast Brazil. Rare but annual spring and autumn wanderer to eastern USA, having been recorded in almost all states. At least one record from Argentina in May, and it may be that some do not return north in their first year.

**HABITAT** Variety of mainly open country: plains, prairies, other grasslands, arctic tundra, semi-desert, savannah, open pine-oak woodland; on migration, also mountain slopes, high meadows, and cultivation with scattered trees; originally wintered to large extent in pampas, but now frequently on farmland with shelter-belts and recent plough. Often on ground. Mainly sea-level to 2,100 m, but in mountain areas passage migrants seen settled at up to 2,800 m and flocks commonly soar at 4,000–6,000 m, in storm conditions rising 'to altitudes possibly approaching 9,000 m' (Smith).

**FIELD CHARACTERS** Big and relatively slender bateo, varying from largely whitish below to mainly dark all over, with small bill, long wings and longish tail. Often sluggish; perches both openly and in cover on wide variety of high or low vantage points, including trees, telegraph poles, posts and hummocks; may allow fairly close approach; often walks on ground; wing-tips reach or just exceed tail-tip. Polymorphic: darker morphs usually only 1–10% of population, but 35% in north

California; pairs tend to be of same morph. Sexes similar and, though much overlap in size, female averages 4% larger and perhaps 18% heavier (largest females 18% bigger than smallest males); juvenile much closer to adult in wing and tail proportions than those of most other buteos (see fig. 48 on p. 707), but appearance very different; adult plumage not assumed until nearly two years old.

**PERCHED** **Pale-morph adult** Above, dark brown to dark greyish-brown, thinly edged rufous-buff; grey-brown tail with obscure thin dark bars, broader subterminal band and white tip, and more or less complete whitish U on uppertail-coverts; small white area on forehead and, usually, large white throat patch contrasting with dark cheeks and broad brown or chestnut to dark brown breast-band (sometimes incomplete); whole abdomen may be almost plain whitish or variably dark-banded, often mainly on flanks or sometimes (chiefly females) right across. **Dark-morph adult** Sooty-brown or, rarely, black all over except for tail as in pale morph, always whitish to buff crissum more or less dark-banded, often pale U on uppertail-coverts, and sometimes small white patches on forehead and throat. **Rufous-morph adult** Very variable, but barring or entire ground colour of abdomen and thighs rufous to solid dark rufous-chestnut; crissum always creamy to buff and barred rufous. **Pale-morph juvenile and second-year** Immatures of all morphs have strongly patterned head, including streaked crown, white forehead, and buff supercilia, cheeks and throat contrasting with dark eye-lines and malar stripes; also tail as adult, again with pale U above base; otherwise pale morph predominantly brown above, broadly buff-edged, and creamy-white below, variably spotted, blotched or streaked with dark brown, these marks sometimes strongest at chest-sides and tending to join in pectoral band. **Dark-morph juvenile and second-year** Differs in typically having much narrower buff edges above and being far more heavily streaked and blotched below, including on abdomen and thighs. **Rufous-morph juvenile and second-year** Differs in more rufous edges above, and rich rufous tone to strongly blotched belly and thighs. **Bare parts** Adult eyes dark brown, juvenile pale brown to reddish-brown. Adult cere yellow, juvenile greenish, becoming yellow. Adult legs yellow, juvenile paler yellow.

**FLIGHT** Medium-sized, lanky raptor with relatively long and rather pointed wings (p7–9 elongated) and fairly long, squared tail; wingspan 2.6 times total length. Light easy beats at moderate speed, interspersed with glides on slightly raised wings with hands flat; soars on angled V wings and slightly spread tail, tending also to rock from side to side; frequently hovers, or hangs into strong winds. **Adult** Very variable (see 'Perched'), but constant features include finely dark-banded grey tail with only slightly wider subterminal band and (except on darkest individuals) white U above base, giving pale-rumped effect; from below, distinctive dark grey flight-feathers (not silvery and only obscurely barred) usually contrast with white, buff, rufous or more or less mottled and barred wing-linings and not particularly obvious carpal arcs, but linings sometimes all blackish-brown on dark morph; in light-coloured majority, underbody may be nearly plain whitish, or finely barred dark or rufous, with prominent white throat and brown to chestnut pectoral band; dark morphs may have dark brown,

North America; it would also be low for a successful buteo. The main winter quarters appear to involve an area of less than 2 million km<sup>2</sup>, within which loose parties of tens and sometimes hundreds are not infrequent during November–February. All in all, a six-figure population seems likely, but within that scale it may be higher than expected. Breeding numbers are generally considered stable, apart from reductions in the west (Oregon and, particularly, California, with reported 90% decline in latter state), but the intensification of cereal crops and increasing use of more harmful pesticides in northern Argentina may well have long-term effect.

**GEOGRAPHICAL VARIATION** Monotypic, but at all ages polymorphic, with three main morphs but many intermediates.

**MEASUREMENTS** ♂ wing 362–406 mm, ♀ 375–427 mm; ♂ tail 185–214 mm, ♀ 194–234 mm; ♂♀ tarsus 62–76

mm. **Weights** ♂♀ 595 g–1.24 kg; ♂ 683–936 g, ♀ 937 g–1.37 kg; ♂ average 908 g (five), ♀ average 1.7 kg (seven).

**REFERENCES** Ambrosetti (1919), Bechard (1982, 1988), Bednarz (1988a), Blake (1977), Browning (1974), Clark (1981), Clark & Wheeler (1987), Delius (1953), Dunkle (1977), Estep & Teresa (1992), Fitzner (1980), Fjeldså & Krabbe (1990), Fox (1956), Gjai (1950), Gilmer & Stewart (1984), Henry & Kaiser (1979), Hilty & Brown (1986), Houston (1974), Houston & Millar (1981), Houston *et al.* (1991), Howell & Webb (1995), Janes (1985), Jaramillo (1995), Johnsgard (1990), Kirkley (1991), Littlefield *et al.* (1984), Olendorff (1973, 1974), Meyer de Schauensee & Phelps (1978), Palmer (1988), Richards (1962), Ridgely & Gwynne (1989), Risebrough *et al.* (1989), Rudolph & Fisher (1993), Schmutz (1984), Schmutz & Hungle (1989), Sick (1993), Skutch (1945), Slud (1964), Smith & Murphy (1978), Smith (1980, 1985), Smith *et al.* (1986), Snyder & Wiley (1976), Stendell & Gilmer (1988), Stiles & Skutch (1989), Thunro & White (1983), Wheeler & Clark (1993), White *et al.* (1989), Wollinden (1986), Woodbridge *et al.* (1995), Zotta (1931).

## 194 GALAPAGOS HAWK *Buteo galapagoensis* (Gould, 1837)

Plate 60

Proposed name: Galapagos Buzzard

**DISTRIBUTION** Neotropical (1°N to 2°S); order 3; local and scarce to not uncommon. Endemic to Islas Galápagos [Galapagos Islands], formerly over all islands except northwestern outposts of Calpepper [originally Darwin] and Wenman [Wolf] and northeastern Genovesa [Tower]; now greatly reduced on one of the central larger islands, Santa Cruz [Indefatigable], and extinct on the small adjacent Seymour, Baltra and Daphne, as well as on the southern Santa María [Charles] and the larger eastern San Cristóbal [Chatham]. By the year 2000, over 85% of breeding territories were on only five islands – Santiago [James], Isabela [Albemarle], Santa Fé [Barrington], Española [Hood] and Fernandina [Narborough] – plus small numbers on Pinta [Abingdon], Marchena [Bindloe], Pinzón [Duncan] and Santa Cruz itself (see Population).

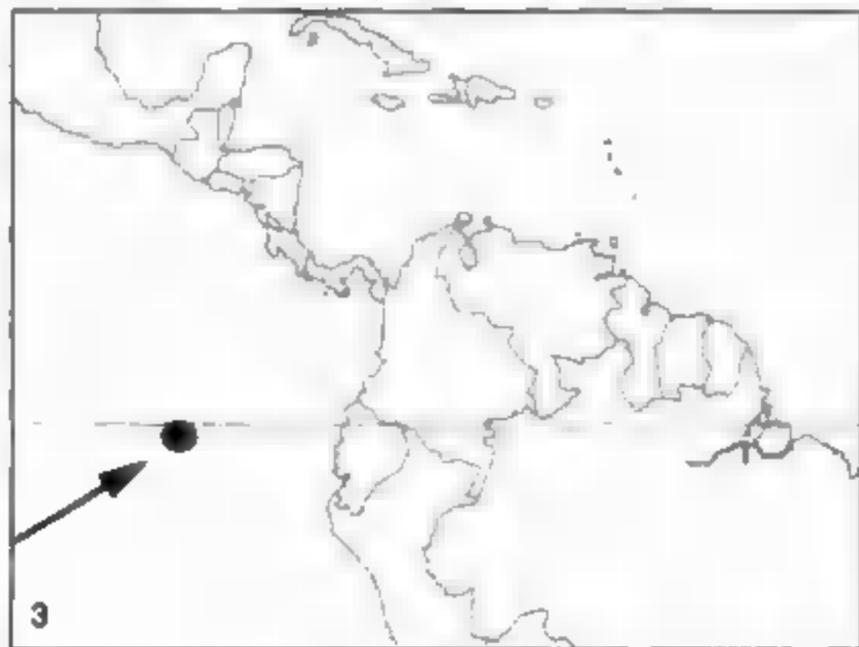
**MOVEMENTS** Sedentary. Apparently no recorded evidence of inter-island movements, but the size of non-breeding populations on some islands possibly suggests that expelled juveniles (see Breeding) may cross intervening waters. The species must also originally have

colonised individual islands gradually from one to another. (And perhaps the first colonisation of all was by ancestral White-tailed Hawks [195], to which this species is closely related).

**HABITAT** Occurs almost anywhere on the islands where it is still found, from shorelines to highest points, from open country to deciduous woodland (including *Bruscia* at arid lower levels and *Scaevola* in humid higher zones), but nests only in dry areas: lava desert with cactus and thorn scrub, crater uplands. Sea-level to 1,700 m.

**FIELD CHARACTERS** Large buteo, mainly black as adult, with longish tail, powerful legs, and unexpectedly long wings for sedentary island endemic. Perches openly on rocky outcrops, dead branches, posts and hummocks; wing-tips reach end of tail. Sexes similar but female 4–19% larger, without overlap; juvenile very different.

**PERCHED Adult** Mainly sooty-black (blackest on crown) with thinly blackish-banded grey tail, but obscurely edged with grey-brown and buff above and with rufous on flanks and belly, and more conspicuously banded with white on uppertail- and undertail-coverts; some whitish often showing through on back as well. **Fresh juvenile** Dark brown above, edged and scaled whitish-buff, with obscure dark eye-lines and malar stripes against pale buff cheeks; creamy tail very thinly banded with blackish; except for whiter throat, all rich buff below (or even rufous-chestnut on breast and belly when first fledged), spotted and blotched with blackish. **Worn juvenile** Medium brown above with worn edgings, and more whitish below with browner spots. **Bare parts** Adult eyes brown, juvenile grey-brown to yellowish-brown. Adult cere yellow, juvenile grey-green. Adult legs yellow, juvenile greenish-yellow. **FLIGHT** Medium-sized raptor with relatively long broad wings and longish tail; wingspan 2.5 times total length. Slow flexible beats; soars on raised wings; often hangs into wind and sometimes hovers. **Adult** Above, mainly blackish but for fine dark barring on white-tipped grey tail and thin white bars on tail-coverts, as well as obscure



outside Amazonia, Andes and Patagonia; from sub-coastal Texas (north to near Houston) and north Mexico (from south Sonora and Nayarit on Pacific slope, Durango and Zacatecas in interior, and Tamaulipas and north Veracruz on Caribbean slope) very patchily southeastwards to Chiapas and Yucatan peninsula, and on through Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama to northwest Colombia; thence only east of Andes from northeast Colombia through Venezuela to Guianas and north Brazil (to Ilha de Marajó), and from southeasternmost Peru, north and east Bolivia and southeastern Brazil (Mato Grosso and Bahia southwards) through Paraguay and Uruguay into much of northern, central and eastern Argentina south to Chubut (about Trelew); also Aruba, Curaçao and Bonaire (Dutch Lesser Antilles), Isla Margarita (Venezuela), and Trinidad (where rather rare resident).



**MOVEMENTS** Generally regarded as mainly sedentary (despite old reports of northward migrant flights in eastern Mexico in spring), but immatures dispersive. Casually northeast to Louisiana, and northwest to New Mexico and Arizona (where formerly nested). Old specimens from mountains near Quito, Ecuador, may also indicate wandering; and most records from Belize (where apparently uncommon) thought to involve transients.

**HABITAT** Savannah, prairie, scrubby grassland, ranchlands with shelterbelts, hill slopes, and other open or lightly wooded country, usually in drier areas with scant or low vegetation, ranging from semi-desert to the tangled cerrado of Brazil's tableland, in both lowlands and foothills; soars over cultivation; may even appear near large city centres, such as Rio de Janeiro. Sea-level to 1,900 m, and recorded to 2,400 m in Bolivia, but mainly below 1,000 m.

**FIELD CHARACTERS** Large, stocky buteo, white-tailed and typically pale grey to slate-grey with rufous shoulders as adult, and with long wings, shortish rounded tail (juvenile clearly longer), and longish legs. Perches openly enough on trees, bushes, pylons, telegraph poles, fences and hummocks or flat ground; wing-tips clearly exceed tip of tail (but only just do so or barely reach it on juvenile). Sexes similar and, though largest female may be up to 17% bigger than smallest male (those of northern populations also tend to be darker above and

more barred below), much overlap and mean difference only about 5%; juvenile quite distinct.

**PINCHED Pale-morph adult** Mainly grey to blackish-slate above with dark cheeks and sometimes dark throat, and otherwise white to greyish-white below with variable barring (see Geographical Variation); constant features are some white above lores on to forehead, rufous shoulders (lesser wing-coverts and upper scapulars), white rump and tail with few very fine dark wavy lines and prominent black subterminal band. **Dark-morph adult** (very rare in north, uncommon east of Andes) Tail as on pale morph, but otherwise mainly pale slate-grey to blackish (see Geographical Variation) with variable rufous shoulders and rufous barring on flanks and thighs (sometimes no rufous at all), and white bars on crissum and, more obscurely, rump. **Pale-morph juvenile** Much darker than typical adult, being predominantly blackish-brown above and below, edged rufous-tawny on back and, especially, wing-coverts and variably cream-streaked on cheeks, breast (forming more or less conspicuous creamy-white patch) and belly; longest uppertail-coverts and crissum white with dark mottling; mainly pale grey tail with fine dark bars and obscure subterminal band, but can show irregular darker central and outer rectrices without the subterminal band. **Dark-morph juvenile** All more extensively black-brown (but for some rufous edges), this colour extending to whole crissum; breast may be all dark or still show creamy patch; tail as pale juvenile. **Second-year** Although part of continuous moult rather than clear intermediate plumage, this stage can be confusing; general tone of head and upperparts is still blackish-brown, but shoulders may be rufous and greyish tail show broad subterminal band, while lower breast and belly may be heavily mottled with blackish and rufous between wholly white chest and whitish crissum. **Bare parts** Adult eyes light brown, juvenile darker. Adult cere yellowish-green, juvenile grey-green at first. Adult legs yellow, juvenile paler.

**FLIGHT** Medium-sized raptor with buteo head shape, long pointed wings pinched in at rear base, medium tail (longer on juvenile); wingspan 2.5 times total length. Heavy action with slow beats; glides with arms raised and hands flat; frequently soars on clearly raised wings; often hovers or hangs into wind. **Pale-morph adult** Grey to blackish-slate above with dark cheeks (and, variably, throat), rufous shoulders, and mainly white rump and tail with broad black subterminal band; below, body and tail predominantly white, but sides of head (and, variably, chest-sides and whole throat) dark grey to blackish, flanks and belly often finely barred dark grey to rufous, and black subterminal tail-band conspicuous; wing-linings may look almost plain white or be finely or more strongly barred with grey or rufous, but appear paler than flight-feathers; latter are grey with obscure barring and broad dark tips, but outer primaries are whitish-based (giving contrast to blackish carpals), while inner primaries are darker than secondaries. **Dark-morph adult** Tail and flight-feathers as on pale morph, but otherwise largely slate-grey to blackish (see Geographical Variation) but for, usually, obscure barring on crissum and rump, some rufous on shoulders and often rufous barring on flanks and thighs (sometimes no rufous anywhere). **Juvenile** Predominantly blackish-brown above and below, but for variable creamy or white mottling

and breast white, and abdomen barred rufous or grey. **Bare parts** Adult eyes brown to yellowish-brown, juvenile darker. Adult cere greenish-yellow, juvenile yellow-green. Adult legs yellow, juvenile paler.

**FLIGHT** Middle-sized raptor with buteo head shape, long and not particularly broad wings rather pointed (p5 and p6 relatively short, p8 longest: see fig. 46 on p. 674 and cf. Gurney's Hawk [198]), and medium tail (longer on juvenile); wingspan 2.5 times total length, tail length three-quarters of wing-base. Stiff shallow beats; glides and soars on slightly raised wings; often hovers with floppy beats or hangs into wind. **Pale-morph adults** (generally predominant) Variably grey to blackish-slate above, with streaky cheeks lacking defined hooded effect, and mantle either grey (male) or rufous (usually female), all contrasting sharply with largely white tail and bold black subterminal band; below, general effect rather pale, with mainly white tail, body and wing-linings, barred and darker-tipped grey flight-feathers, and black wing-ends and tail-band, but flanks and outer wing-linings vary from obscurely grey-barred (more often male) to having stronger grey or rufous bars that may even extend across abdomen (usually female). **Dark-morph adult male** Flight-feathers and contrastingly white tail as on pale morph, but upperparts, underbody and wing-linings all dark slate-grey except for paler grey greater coverts forming diagonal on underwings. **Dark- and barred-morph adult females** Above, all blackish-grey apart from more or less chestnut mantle and standard white tail; below, flight-feathers and tail as pale morph, but head blackish-grey, wing-linings (lesser and median coverts) and thighs similar, or mixed with chestnut, or white with blackish bars, and underbody varying from mainly chestnut (with some mixture of grey) to rufous on chest (or just centre of breast) above slate- or rufous-barred abdomen. **Pale-morph juvenile** Dark above, with variable creamy-white markings on head, buff-mottled wing-coverts, and dusky-barred grey tail; underbody and wing-linings whitish to pale buff with, apart from moustaches and gular stripe, blackish streaks on throat, breast and forewings, giving way to bars on abdomen and greater wing-coverts, against greyish tail and pale-based flight-feathers all narrowly barred. **Dark-morph juvenile** Tail and flight-feathers as pale morph, but otherwise all dull blackish-brown with some inconspicuous pale mottling. (See also figs. 45 and 48 on pp. 665 and 707.)

**CONFUSION SPECIES** Subterminal black band on white tail of adults recalls White-tailed Hawk [195] (which overlaps in range, especially in Argentina), but that species has projecting wing-tips at rest, pinched-in rear wing-bases in flight and, on pale morph, rufous shoulders (never mantle) and often black throat. (Only other raptors with comparable white tail and single bold subterminal band are certain populations of White Hawk [172], and some of its congeners, but they are very different in other ways.) Dark morphs of White-tailed and male Red-backed Hawks can be very similar but, apart from the differences in shape, White-tailed is more solidly black (rather than slate-grey to blackish-slate) and, in flight from below, has blacker greater underwing-coverts, as well as inner primaries more clearly darker than outers and secondaries. Distinction between dark-morph juveniles of the two species can be difficult, but White-tailed often shows some trace of

creamy breast-patch and whitish U above base of tail. See also other dark-morph buteos, especially Swainson's Hawk [193] (dark flight-feathers, pale crissum and U above tail) and Short-tailed Hawk [191] (smaller, with shorter tail and wings, latter held flatter, and more silvery flight-feathers below). Strong risk of confusion at all ages with Gurney's Hawk [198], which, in different proportions, shares most of Red-backed's various plumages, but has restricted distribution in mainly higher Andes (central Colombia to northwest Argentina): distinctions are discussed under it.

**VOICE** Often silent, but at times loud *kreyah* or shrill *kerow* while soaring. Very noisy when intruders near nest: shrill *zerak-zrak...* or *kyeah-kyeah* (Brown & Amadon) or loud *kerow-kyow-kyow...* (Fjeldså & Krabbe).

**FOOD** Mainly mammals (over 90% in two studies), especially such rodents as cavies *Cavia*, degus *Octodon*, tucotucus *Ctenomys* and juvenile rabbits *Oryctolagus*; but also some orthopterans, frogs, lizards, birds (injured or young?) and probably snakes. Regularly forages on wing, by hovering or by kiting into wind: if no prey located, glides on for hundred metres or so and hovers again. Also still-hunts from rock, post, cactus or similar perch. At higher latitudes or altitudes, may be active throughout day.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Much single and mutual high-circling; no data on other aerial displays.

**BREEDING** December–July in Ecuador and perhaps also Colombia; September–January in Chile, Argentina and Falklands. Bulky stick nest, 75–100 cm across and, because used for years, often deeper still; lined with green leaves, moss, lichens and rubbish; often at only 2–7 m in cactus or thorn bush, or small or large tree, or on telegraph pole, pylon, cliff ledge or rock, or in tussock on steep hillside. Clutch 1–2 in Ecuador, 2–3 in Chile and Argentina. Incubation 26–27 days. Fledging 40–50+ days.

**POPULATION** Limits of total breeding range enclose c4.5 million km<sup>2</sup> (and migrants in austral winter occur thinly over perhaps another 1.2 million km<sup>2</sup>). No data on densities, but 'relatively common' in Andean and Patagonian Argentina, commonest hawk in premontane and montane Ecuador, and considered commonest raptor above treeline in study areas in southwest Colombia, so six-figure population seems reasonable assumption. Even so, now believed to be decreasing in some parts of Ecuador, Chile and Argentina.

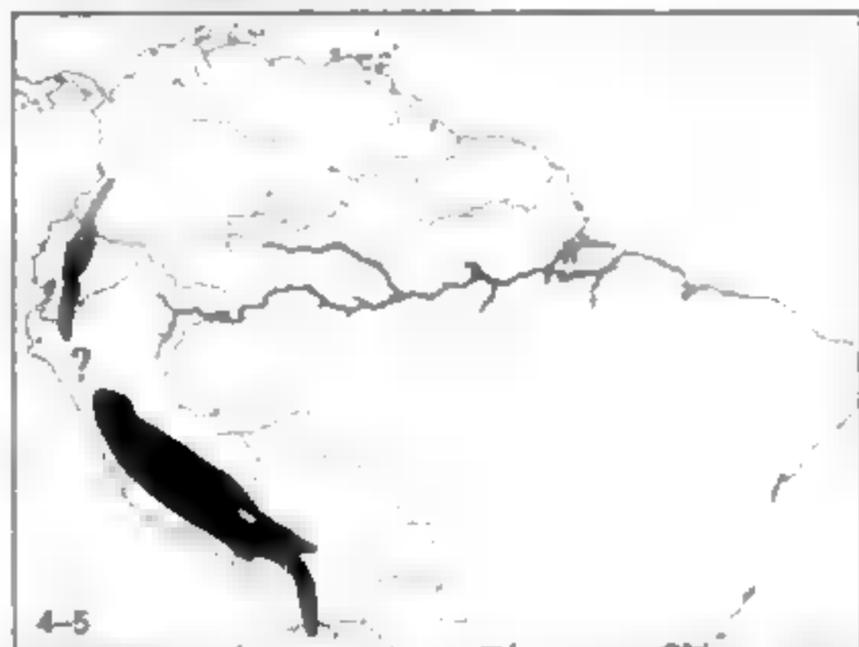
**GEOGRAPHICAL VARIATION** Leaving aside Juan Fernández Hawk [197] – see below – Red-backed is generally treated as monotypic, though considerable variation in size and three questionably distinct races have been named: biggest birds tend to be in high Andes and smallest ('*peruviansis*') in coastal Peru and Ecuador. Species is also polymorphic everywhere, with some plumage patterns largely or entirely sex-linked: in particular, females of both pale and dark morphs are unknown without any rufous (though, conversely, some males do have the rufous mantle otherwise typical of females). Juan Fernández Hawk, often treated as conspecific, is an island taxon long isolated by at least 680 km of sea and differing distinctly in that the sexes are similar, with neither showing rufous. Gurney's Hawk [198] is also sometimes treated as high-altitude form of Red-backed,

**198 GURNEY'S HAWK**  
*Buteo poecilochrous* (Gurney, 1879)

Other names: Puna Hawk, Variable Hawk

Proposed name: Gurney's Buzzard

**DISTRIBUTION** Neotropical (0°, or perhaps 4°N, to 23–26°S); order 4–5; locally rare to generally common. Endemic to high montane South America: Andes from Ecuador, perhaps also southwest Colombia, through Peru and southwest Bolivia (La Paz and Cochabamba to Potosí) into north Chile (Tarapacá, but rare) and northwest Argentina (Jujuy).



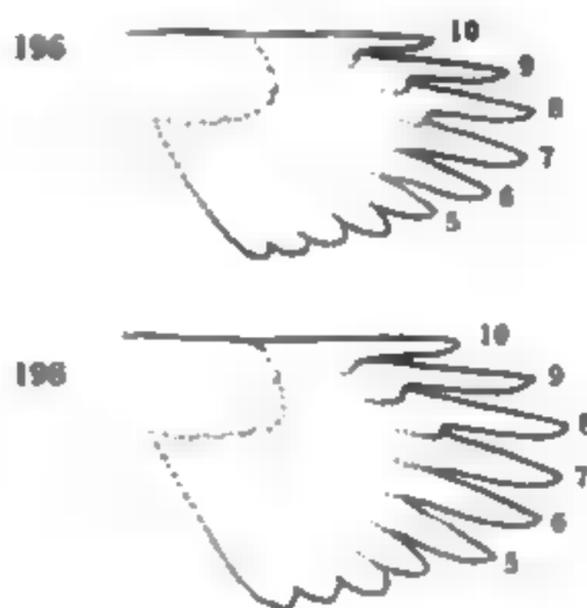
**MOVEMENTS** Generally considered sedentary, apart from altitudinal changes: thus, in north Chile breeds at around 4,500 m and drops down nearer to 3,000 m at other times of year. But at northern and southern ends of range, in southwest Colombia (Nariño, Valle, Cauca) and northwest Argentina (Jujuy, probably also west Salta and, northwest Catamarca), unclear whether the few records relate to small local breeding populations or simply to wanderers: situation also complicated by confusion with Red-backed Hawk [196].

**HABITAT** High and rugged inter-Andean valleys, cliffs and plateaux, almost entirely between timberline and snowline; sometimes in areas of mountain scrub or low gnarled *Pohlepis* woodland, but mainly on open grassland plateaux (of both northern wet páramo and drier puna to south) and steep rocky slopes, even in rain-shadowed montane 'deserts'. Chiefly 2,000–5,000 m, but (migrants?) recorded down to 900 m in Colombia.

**FIELD CHARACTERS** Large buteo, as adult white-tailed and, typically, either rufous-backed and barred or all dark, but very variable, with long wings and legs and relatively short tail (juvenile tail clearly longer). Perches mainly on rocks, ledges and ground, also posts and trees as available; wing-tips variously said to 'almost reach' or exceed tail-tip. Polymorphic, like related Red-backed Hawk [196], but barred and dark morphs much commoner, extensively rufous underparts apparently unknown, and presence or absence of rufous mantle less clearly sex-linked. Sexes not necessarily dissimilar; female appears to average only 2% larger, with great overlap; juvenile quite distinct.

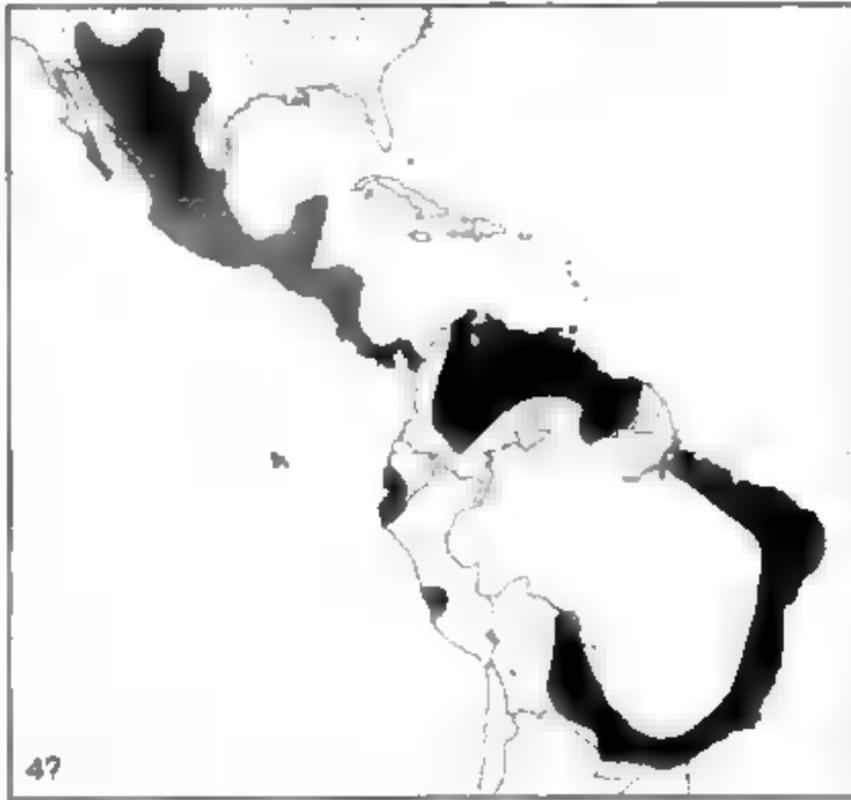
**PERCHED Adult** Highly variable, much as Red-backed Hawk (which see), and with virtually identical range of

morphs and intermediates (though in very different proportions) and, again, tail always white with obscure fine dark wavy lines and prominent black subterminal band. Three main differences, other than structural: (1) Red-backed's 'dark-morph adult female' unknown in Gurney's; (2) rufous mantle appears much more frequent in Gurney's and thus less likely to be sex-linked; and (3) commonest plumages of Gurney's are those described as rare under Red-backed's 'barred-morph adult female' and 'dark-morph adult male'. **Juvenile** Similar to juvenile Red-backed, no less variable and very difficult to distinguish in field, though dark morph much commoner ('about half the individuals': Meyer de Schauensee) and even pale morph usually more boldly and solidly marked below, especially on flanks, belly, thighs and wing-linings. **Bare parts** As Red-backed.



**Fig. 46.** Wing-formulae of Red-backed Hawk *Buteo polyzona* [196] (upper) and Gurney's Hawk *B. poecilochrous* [198], to show how the latter's longer p5 and p6 give it a broader and rounder wing-tip. Both species are polymorphic, with sex-linked differences too, and, though some morphs are found in one and not the other (and pale morphs much commoner in Red-backed, barred and dark morphs far commoner in Gurney's: see both texts), some individuals can be impossible to identify in areas where the two species overlap altitudinally, except by proportions and flight actions. Photographs of soaring individuals could be used to confirm their identities through their wing-formulae.

**FLIGHT** Bulky raptor with typical smallish buteo head, but 'more eagle-like profile' (Fjeldså & Krabbe) as result of short and noticeably broad tail and large broad-based wings that appear more rounded (p5 and p6 clearly longer, and p8 may be shorter than p6; see fig. 46 and cf. Red-backed Hawk [196]), but wings narrower and tail longer on juvenile; wingspan 2.5 times total length, tail length two-thirds of wing-base. Relatively soft beats; soars on raised wings but glides flat (Fjeldså & Krabbe); often hangs into wind or, much less often, hovers with slow beats. **Dark-morph adults (generally predominant)** Dark slate above with, or less usually without, chestnut mantle; always white tail with bold subterminal band; below, dark slate throat (often whitish-streaked) and chest, sometimes chestnut band across lower breast, but more often



Honduras, but 'status in much of the region [Mexico and adjacent Central America] needs clarification' (Howell & Webb). In Costa Rica, presumed migrants pass through in April and October–November, sometimes with Turkey Vultures [2] and Swainson's Hawks [193]. In Panama, apparent southward passage noted in October, northward in March, and species otherwise most often seen September–March, during northern winter (but increasing records in other months indicate small resident population as well, though breeding not proven). In South America, apart from any breeding in Colombia, Ecuador and Venezuela, one observation from northwest Colombia (foothills of Cerro Tacarcuna, at 400 m in extreme northwest Chocó, in October 1990) ties in with passage through Panama, while sporadic records from the fringes of Amazonia southwards to west Peru (Lima), north and east Bolivia (Beni, Santa Cruz), Paraguay, and southeast Brazil (Paraná), and eastwards through Guyana and Surinam to northeast Brazil (Ilha de Marajó to Ceará, Pernambuco and Alagoas), often alongside Turkey Vultures, seem likely to involve migrants from north of range or simply wanderers.

**HABITAT** Rather varied (seasonally?) from dry to wet, and from closed to fairly open, but often in broken country with water nearby: mountain coniferous or pine-oak forest, timbered canyons and other hilly riverine woodland, dry open boscaje and scrub, but also (non-breeding?) in humid forest and overgrown marshes; forages over ranchland and other open country, usually with scattered trees or thickets, but even in semi-desert. Sea-level to 3,000 m, but in much of range mainly below 1,500 m and in south generally under 500 m.

**FIELD CHARACTERS** Large, lanky buteo, blackish in all plumages, with long wings and longish tail. Most often seen in flight, but perches on trees both openly and within canopy; wing-tips reach tail-tip. Monomorphic and sexes rather similar (differing only in tail pattern), though female much heavier and clearly larger (very slight overlap, but averaging 11% more, with largest females 26% bigger than smallest males); juvenile not dissimilar, but easily distinguished both perched and flying.

**PERCHED Adult male** Entirely slaty-black when perched, but for little white on forehead and sometimes white

bases showing through on nape, bare pale grey lores, and two tail-bands (grey and relatively obscure on upper-side): broad band near centre, and narrower one towards base. **Adult female** Apart from size, differs only in additional narrow tail-band, still nearer base, which may be obscure or more mottled and is hidden by wings or coverts. **Juvenile** Not unlike adult, but browner-black with small white spots scattered on body, often more profusely below; tail pattern quite different, being dark grey-brown above and whitish below, with five to seven well-spaced narrow black bars and broader subterminal band. **Bare parts** Eyes dark brown or red-brown (South American adult yellow?). Cere and legs yellow.



Fig. 47. Two Zone-tailed Hawks *Buteo albonotatus* [199] (foreground and right) soaring below three Turkey Vultures *Cathartes aura* [2], illustrating the similarities of their two-toned undersides and raised wing-positions when gliding; the main differences, apart from the larger size and bare heads of the vultures, are the banded tails and dark trailing wing-edges of the hawks. An example of evident mimicry in both plumage and behaviour, Zone-tails often fly with Turkey Vultures, not only sailing like them on V wings, but rocking or tilting from side to side in a similar manner, which enables them to approach potential bird and mammal prey more closely. It also means that odd Zone-tails may be overlooked in groups of Turkey Vultures. (See text.)

**FLIGHT** Medium-sized, lanky raptor with longish slender wings and tail, former of uniform width (so looking parallel-edged), latter often closed and looking narrower than most buteo; wingspan 2.5 times total length. Highly active, spending much time on wing; has rather slow, loose beats on take-off, and sometimes soars on nearly flat wings and spread tail, but otherwise almost always sails and glides with markedly raised wings and tilting or rocking action like small Turkey Vulture [2], which it mimics also in shape and two-tone underwing pattern (see fig. 47, Confusion Species and Food). **Adult** All slaty-black above, except for one broad grey central tail-band and one (male) or two (female) narrower bands nearer base (where second partly hidden by coverts); also mainly slaty-black below, but tail-bands white and, like thin whitish tip, show up far more clearly (though narrow basal one or two overlapped by coverts except at sides and so hidden if tail closed), while underwings

exotic plants and grazing by introduced animals. 'Continuing threats include forest clearance for agricultural and other developments, logging, the actions of introduced ungulates that degrade native forests and inhibit their regeneration, repeated nest disturbance, and perhaps road-kills.... It formerly suffered extensively from shooting and is currently in conflict with conservation efforts to save the Critically Endangered Hawaiian Crow *Corvus hawaiiensis* which it eats' (BirdLife International). Numbers have usually been regarded as stable since 1980s, but no historical data and it may be that the species is still in slow decline.

**GEOGRAPHICAL VARIATION** Monotypic, but dimorphic.

**MEASUREMENTS** ♂ wing 264–278 mm, ♀ 288–308 mm; ♂ tail 152–159 mm, ♀ 162–171 mm; ♂♀ tarsus 71–88 mm. **Weights** 385–650 g, ♂ averaging 441 g, ♀ 606 g.

**REFERENCES** Anon (1984), Bangko (1980), Berger (1981), BirdLife International (2000), Collar & Andrew (1988), Ehrlich *et al.* (1992), Griffin (1985, 1989), Griffin *et al.* (1998), Hall *et al.* (1997), King (1978/79), Munro (1960), Olson & James (1991), Pratt *et al.* (1987), Scott *et al.* (1986), Thiollay (1994).

## 201 RUFIOUS-TAILED HAWK

### *Buteo ventralis* Gould, 1837

Plate 63

Other names: Red-tailed Buzzard, Patagonian Red-tailed Hawk

Proposed name: Rufous-tailed Buzzard

**DISTRIBUTION** Neotropical (c.36°S to c.54°S); order 3; rare to locally scarce, and generally little known. Southern South America: endemic to lower Andes of Patagonia in southern Chile and Argentina, from Ñuble and southwest Neuquén southwards to, probably, Straits of Magellan. Most southerly recent record in Argentina was from southwest Santa Cruz (M Peatman) and, though the southern limit was quoted as northern Tierra del Fuego by Fjeldså & Krabbe (perhaps following R Clark who gave some details of occurrences on Isla Grande), that may have involved confusion with fossil evidence of ancient presence there? Also, Olog claimed an adult female specimen, with long wings of 450 mm (see Measurements), as far north as Tucuman and from what would be an exceptionally high altitude of 2,000 m, but that seems questionable on several counts and the skin clearly needs reexamination. The true distribution and status are masked by the lack of ornithological investigation of the region concerned, and by earlier assumptions that individuals of this species represented yet further colour morphs of the polymorphic Red-backed Hawk [196] (see Geographical Variation).

**MOVEMENTS** Presumably sedentary or locally dispersive; unrecorded outside known range, but in austral

winter some altitudinal or northward shifts within it must be likely.

**HABITAT** Forest and forest edge, especially southern beech *Nothofagus* and Chile pine *Araucaria araucana*; also 'parkland' and open coastal grassland; immatures sometimes seen 'on ridges and plateaus of Patagonian brush-steppe' (Fjeldså & Krabbe). Sea-level to at least 1,200 m.

**FIELD CHARACTERS** Large buteo, rufous-tailed only as pale-morph adult, with longish wings and tail, and strong feet. Perches openly on trees, posts and rocks; wing-tips just short of tail-tip (well short on longer-tailed juvenile). Dimorphic; dark morph 'not uncommon'. Sexes similar and evidently overlap in size, though female probably averages at least 10% larger; juvenile distinct (but more easily confused with other species).

**PERCHED Pale-morph adult** Mainly blackish-brown above, with cinnamon-rufous tinge to sides and back of head isolating dark cap; and paler edgings especially on median wing-coverts and longer scapulars; contrasting white-tipped rufous tail with eight to nine black bars and broader subterminal band; throat white and dusky-streaked, edged by blackish malar stripes; breast and abdomen cream to pale rufous, variously streaked black, most strongly on flanks and across fore belly, and barred darker red-brown on thighs. **Dark-morph adult** All sooty-black apart from slightly paler edges; tail with white tip and black barring like pale-morph adult, but ground colour dusky-grey (no rufous); variable dusky-rufous tinge to both thighs and crissum, as illustrated (possibly due to partial retention of juvenile feathers). **Pale-morph juvenile** Mainly blackish-brown above, but edged rufous and boldly marked with creamy-white, especially on greater coverts, scapulars and uppertail-coverts, but also on cheeks and tending to form whitish supercilia; tail dusky-grey, or whitish, with eight to nine even bands of black; predominantly white below, variably marked with blackish, mainly in form of malar stripes, streaks at chest-sides, bold elongated blotches on flanks and belly, and spots on thighs. **Dark-morph juvenile** All blackish-brown, but with various cream and rufous edges above and mottling below, tending to dusky-rufous on thighs and crissum; tail evenly banded as on pale-morph juvenile. **Bare parts** Adult eyes brown to red-brown, juvenile paler grey-brown. Cere and legs yellow.

**FLIGHT** Medium-sized raptor with long squarish-tipped



wings and kinked trailing edges, medium-length tail; wingspan 2.6 times total length. Inactive, spending relatively little time on wing. Slow deep beats; glides on more or less level wings, but soars with them slightly raised; occasionally hovers. **Pale-morph adult** Above, looks dark brown with variably lighter nape and mid-wing diagonals, squared pale windows at bases of outer primaries, blackish trailing wing-edges, and narrowly black-banded rufous tail with broader subterminal band and white tip; whitish throat edged by black moustaches and dusky streaks, which can almost form gorget; underbody and wing-linings cream to pale rufous, streaked with black, often heavily in band from flanks across front of belly and, importantly, with flattened patagial triangle of black behind leading edges of inner wings; slightly barred thighs and crissum merge into faintly dark-banded pinkish-grey undertail; flight-feathers with thin dusky barring, so looking grey with whiter primary windows, all outlined by bold blackish trailing edges and wing-tips together with dusky carpal arcs and greyish blotches along greater coverts. **Dark-morph adult** All blackish above with only slightly paler-looking dusky-grey tail, thinly black-banded and white-tipped, but squared light primary windows like pale-morph adult; and largely blackish underbody and wing-linings, with variable lighter mottling, especially on throat or breast, and perhaps dusky-rufous thighs and crissum; under-sides of flight-feathers like pale-morph adult, but dusky-banded grey tail (no rufous) can look paler because of contrast. **Pale-morph juvenile** Dark and light areas strongly contrasted; above, predominantly blackish-brown showing up creamy supercilia, mottled midwing-diagonals more less joining across longer scapulars and rump, and squared primary windows (more conspicuous than on adult), as well as evenly banded black and grey to whitish tail; below, mainly whitish underbody and wing-linings contrast with blackish-edged throat and chest-sides, which tend to run into flattened patagial triangle like adult, and band of blotches and streaks across belly continuing less densely across larger coverts and, more as spots, on thighs; flight-feathers look finely barred greyish with blackish wing-tips, much like adult, but differ in lack of bold blackish trailing-edges and in more contrasting primary windows which emphasise sharper and blacker carpal arcs; tail also greyer with clearer barring. **Dark-morph juvenile** Flight-feathers and tail much as pale-morph juvenile, but body and wing-coverts largely blackish apart from some paler edgings above, variably forming midwing-diagonals, and mottling below, again especially on larger wing-coverts; tendency to dusky-rufous on thighs and crissum. (See also figs. 45 and 48 on pp. 665 and 707.)

**CONFUSION SPECIES** Pale-morph adult unmistakable within its range: easily distinguished by rufous tail and, in flight from below, dark patagia. Pale-morph juvenile long muddled with polymorphic juvenile Red-backed Hawk [196] (similar in size and flight action, if more aerial, but more buff below, underbody more evenly streaked and mottled, thighs barred rufous and, in flight, tail finely patterned, no dark patagia); might also be confused with juvenile White-throated Hawk [192] (smaller, creamier below with brown-banded thighs and, in flight, less distinct primary-panels, again no dark patagia). Dark-morph adult and juvenile more difficult

to separate in field from dark-morph juvenile Red-backed (latter browner, less black, with more parallel-edged and rounder-tipped wings, more finely barred flight-feathers and tail).

**VOICE** 'Harsh prolonged *ke-ahrr*' (Fjeldså and Krabbe).

**FOOD** Little known, but evidently rabbits and other smallish mammals, also birds (Southern Lapwing *Vanellus chilensis* once) and perhaps reptiles. Apparently mainly still-hunts, but also hovers occasionally (while scanning for prey?).

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Single and mutual high-circling, but no other aerial displays described.

**BREEDING** Probably October–January. Only two nests described at c35 m in tall trees: one of sticks, lined with feathers and wool in Chilean oak, the other in laurel. Clutch 1–3. Incubation and fledging periods not recorded.

**POPULATION** No data on numbers or densities, but regarded as rare and difficult to find in both Chile and Argentina. With linear distribution of around 1,750 km, only 350 km wide at its widest point, total range must be well under 500,000 km<sup>2</sup> and population seems unlikely to exceed high end of three figures. No evidence of decline. 'May not be at risk' (Fjeldså and Krabbe).

**GEOGRAPHICAL VARIATION** Monotypic, but dimorphic. As recently as 1940s, often confused with polymorphic and sympatric Red-backed Hawk [196], but evidently closely related to even more polymorphic but far distantly allopatric Red-tailed Hawk [202] of North and Central America (itself a complex of 12 diverse races, some also showing much individual variation, and formerly regarded as constituting at least two species). Indeed, WS Clark has suggested that Rufous-tailed should be considered conspecific with its northern counterpart. The two clearly form a superspecies and have many features in common, not least close similarities in pale-morph plumages, including the distinctive dark patagia, but dark morphs in particular appear to show some significant differences, not least in tail-pattern and colour (even bearing in mind the extraordinary variety in the tails of Red-tailed Hawks), and the ecological tolerances and general success seem contrastingly distinct. Thus, on present knowledge, we have taken the traditional view of treating this clearly relict form, separated by over 5,000 km from the nearest Red-tailed, as specifically distinct.

**MEASUREMENTS** ♂ wing 351–369 mm, ♀ 370–427 mm (B&A indicated ♀ 'occasionally' up to 450 mm, while Blake gave 468 mm as maximum, but perhaps these high figures are symptomatic of the earlier confusion with Red-backed Hawk [196] and it may even be that B&A's 450 mm wing refers to Olrog's specimen; see Geographical Variation and Distribution); ♂ tail 195–238 mm, ♀ 196–241 mm. **Weights** ♂ 950 g; ♀ 1.14 kg (one).

**REFERENCES** Amadon (1964), Blake (1977), Clark (1986), Clark (1986), Collar & Andrew (1988), Daciuk (1977), de la Peña (1992), Fjeldså & Krabbe (1990), Greer & Bullock (1966), Humphrey *et al.* (1970, 1993), Jaksic & Jiménez (1986), Johnson (1965), Meyburg (1986), Natosky & Yzurieta (1995), Olrog (1948), Rasmussen & López (1988), Rasmussen *et al.* (1992), Venegas & Jory (1979), Vuilleumier (1985).

to wider dark brown subterminal band (*calurus* can have 7–11 additional thin dark bars); whitish below, often rufous on sides of chest, and usually with complete or partial belly-band of short dark brown streaks, but variable, and belly sometimes virtually unmarked, while *calurus* more rufous-washed and additionally has flanks and thighs barred darker rufous (see Geographical Variation). **Dark-morph western adult (*calurus*)** Head, body and upperwing-coverts dark chocolate-brown to, rarely, jet-black, usually lacking pale mottling though sometimes hint of this on scapulars and wing-coverts; rufous tail as light-morph adult, with wide dark subterminal band and often 7–11 narrow dark bars; undertail-coverts somewhat paler than rest of underparts, usually rufous or rufous-banded. **Rufous-morph western adult (*calurus*)** Similar to dark-morph adult above, including tail, and only rarely with rufous mottling forming incomplete V on back; below, rich dark rufous breast separated from similarly coloured but generally also dark-banded thighs and crissum by solid, wide uniformly dark chocolate-brown belly-band. **Adult Harlan's Hawk (*harlowi*)** Head, upperparts and upperwing-coverts coal-black, usually faintly streaked on head-sides, and with grey mottling or speckles on scapulars; apart from white throat, underparts most often black with variable amount of whitish streaking on breast and barring on thighs and crissum (dark morph), but ranging from uniformly black including throat (extreme dark morph) to all white with few blackish blobs on belly (rare pale morph, which generally also has more white on head); extremely variable tail of five main types, commonly pale greyish-white with dark grey longitudinal mottling and usually marbled subterminal band, but ground colour can be white, pale grey or dark grey and either mottled or plain, subterminal band can be of moderate width or broad, or tail can even (less frequently) be fully barred on white or pale/dark grey ground and have neat regular subterminal, in addition to all of which some individuals show mixed pattern of mottles and bars and, moreover, many have some rufous on distal tail. **Adult Krider's Hawk** Similar to pale-morph adult, but with much more white: head mostly white, crown invariably so, with darker nape, rarely dark line through eyes, sometimes streaky dark moustaches and few dark streaks on rear ear-coverts; brown upperparts and upperwing-coverts heavily mottled with white; tail whitish at base, otherwise pale pinkish-rufous with very narrow dark subterminal band; all white below, lacking any trace of belly-band (thus differing from pale adult Harlan's). **Pale-morph juvenile** Mid-brown head paler than adult's, often with some white streaking, and darker thin moustaches; upperparts and upperwing-coverts darker brown with pale feather-edges, greater coverts more strongly whitish-fringed, and white mottling on scapulars forming incomplete pale V on back; tail light brown, often washed rufous (sometimes as bright as on adult), with numerous equal-width narrow dark brown bars, subterminal occasionally somewhat wider than rest; white below, initial rufous bloom on breast quickly fading, and always with distinct belly-band of short dark streaks and, often, some barring (mainly *calurus*, on which bars often extend to thickly feathered thighs and much of crissum). **Dark-morph western juvenile (*calurus*)** All dark chocolate-brown, often with pale mottling on scapulars,

sometimes very narrow tawny-rufous edges to breast-feathers; tail like that of pale-morph juvenile, but dark bars can be narrow or very wide and intervening paler bars only rarely rufous-washed; at closest ranges, majority have dark shaft-spike at tips of rectrices and most secondaries, apparently not shown by other races (BK Wheeler). **Rufous-morph western juvenile (*calurus*)** Lacks rufous of adult: similar to pale-morph juvenile, and same tail pattern, but differs in heavily streaked breast, heavily mottled belly-band looking more solidly dark, and strongly dark-banded thighs and crissum. **Juvenile Harlan's Hawk (*harlowi*)** Head and entire upperside blackish-brown, similar to Harlan's adult and to dark western juvenile *calurus*, but sometimes some white streaking on head and normally more obvious white or grey edging/mottling on wing-coverts and scapulars; tail similar to dark-morph juvenile *calurus*, but dark bands usually wavier; white throat but otherwise underparts variable, typically blackish with heavy white breast-streaking (so-called intermediate morph), though frequently entirely white-streaked or, occasionally, dark-breasted with white spots/mottling on belly (BK Wheeler), and often barred black-and-white undertail-coverts, or, more rarely, uniformly dark with no white at all (extreme dark morph, entirely black above and below) or white below with dark belly-band of short streaks (pale morph). **Juvenile Krider's Hawk** Similar to Krider's adult, except for white tail that has three or more narrow dark bars on distal half (some individuals with fully barred tail probably intergrades with *bonalis/calurus*), and band of dark brown spots across belly. **Bare parts** Adult eyes medium to dark brown, juvenile pale yellow. Adult cere greenish to yellow, juvenile greenish, very exceptionally yellowish. Legs yellow to greenish-yellow. **FLIGHT** Medium-sized, compact raptor with rather broad head, short neck, long and broad rounded wings with bulging secondaries and five fingers, and medium-length tail shorter than wing-bases (juvenile distinctly narrower-winged and noticeably longer-tailed: see also caption to fig. 42 on p. 646); wingspan 2.5 times total length. Flight somewhat cumbersome, with slow, stiff and steady deep wingbeats; glides on level wings or hands slightly lowered; soars frequently with wings in slight dihedral; hunts regularly from glide and hover. **Pale-morph adult** From above, appears uniform dark brown, except for white mottling forming incomplete V on back, often hint of paler band (mottling) along greater coverts, and whitish U on uppertail-coverts that accentuates strikingly obvious rufous tail with dark brown subterminal band (*calurus* with up to 11 additional thin bars); whitish-looking from below, chest-sides generally rufous, with dark head-sides showing, belly usually dark-streaked (occasionally unmarked), and wing-linings with dark leading edges and carpal arcs, and often less obvious dark line along greater coverts, against only slightly greyer flight-feathers with indistinct thin bars and contrasting broader blackish trailing edges and wing-ends, while undertail looks paler than above, even pinkish, though still with dark subterminal band (*calurus* usually dark-throated and more rufous-washed below, with stronger patterning including barred flanks and thighs: see Geographical Variation). **Dark-morph western adult (*calurus*)** Uniformly dark above (dark chocolate-brown to, rarely, jet-black), or with slight suggestion of

paler spotting on scapulars and wing-coverts, but for contrasting rufous tail with wide dark subterminal band and c7-11 very narrow dark bars; below, dark brown body and wing-linings against heavily grey-banded silvery flight-feathers made more contrasting by dark trailing edges and wing-tips, while tail as above and usually also some rufous bars on crissum. **Rufous-morph western adult (*calurus*)** Similar to dark-morph adult above, including tail pattern, rarely hint of broken rufous V on back; below, dark rufous body and wing-linings with broad uniform dark brown band across belly and brown bars on thighs and crissum, as well as darker forewing-coverts, but otherwise much as dark morph (plate 67 somewhat inaccurate). **Adult Harlan's Hawk (*harlani*)** Looks largely black above, usually with little grey speckling on scapulars (and occasionally on wing-coverts), but for whitish U above highly variable tail, which is often dirty white with dark grey mottling and indistinct (marbled) dusky end-band, but can be greyer with mottling and end-band darker or, infrequently, white to dark grey with six to eight narrow wavy black bars and broader neat subterminal band (for other possible patterns, see 'Perched'); undertail similarly variable and rest of underside even more so, most often black on body and wing-linings with white throat, much white streaking on breast, thinly white-banded rear flanks and undertail-coverts, and regularly dark-banded silvery remiges with barred black fingers and solid black trailing edges; but can lack white on throat/breast, and, conversely, few are mostly white below with black streaks/blobs across belly, few black spots/streaks on linings, especially lesser coverts, and small carpal arcs, and remiges sometimes more mottled than barred (such pale individuals usually show more white on head, too). **Adult Krider's Hawk** Resembles pale-morph adult but much whiter: all-white head (but for darker nape and, very rarely, dark line through eye) contrasts with brown back and upperwing-coverts that are heavily mottled with white, especially scapulars and, often, as pale upperwing-diagonal, while narrow bars on remiges often visible from above; white uppertail-coverts quite noticeable above whitish-based tail which otherwise pale rufous-pink with very thin dark subterminal band; white below, underbody unmarked and dark leading wing-edges reduced, but usually narrow dark carpal arcs, and silvery-white remiges narrowly barred grey with dark trailing edges and barred blackish fingers. **Light-morph juvenile** Variably white-streaked head somewhat paler-looking than dark brown upperparts on which white mottling forms pale V on scapulars and pale band along greater coverts, while finely dark-banded flight-feathers show contrastingly pale (dark-banded whitish) primaries with dark tips and trailing edges, upperwings appearing two-toned; whitish U on uppertail-coverts above rufous-washed (even brightly so) light brown tail with many thin equal-width dark brown bars, or subterminal band slightly wider than others; below, apart from dark moustaches and sometimes (western race) dark-streaked throat, underparts clear white (initial rufous wash on breast fades quickly) with dark belly-band more distinct than adult's, and underwings with smaller dark marks on inner leading edges, variable dark streaking on greater coverts and dark carpal arcs, but greyer flight-feathers always narrowly barred darker with dusky trailing edges

paler and narrower than on adult, and trapezoid-shaped pale primary-panels; light undertail patterned as above. **Dark-morph western juvenile (*calurus*)** Head and upperparts all dark brown, scapulars sometimes with light mottling, but upperwings two-toned with paler diagonals (along greater coverts) and pale hands, latter with distinct narrow dark bars that become less obvious across secondaries, and uppertail as that of pale-morph juvenile or slightly darker, but only rarely washed rufous and with dark bars either narrow or very wide; below, similarly dark brown underbody (any thin tawny edgings on breast hardly visible) and wing-linings, latter sometimes streaked buff/rufous, contrast paler remiges and undertail which both patterned as light-morph juvenile except that dark tail-bars more variable in width. **Rufous-morph western juvenile (*calurus*)** Similar to pale-morph juvenile (thus lacking rufous tones of rufous adult): more or less identical above, but, below, differs in well-streaked breast, strongly mottled and more solid-looking dark belly-band and wing-linings (so that dark patagial marks somewhat masked), and heavily barred trousers and crissum. **Juvenile Harlan's Hawk (*harlani*)** Blackish-brown head (sometimes faintly white-streaked) and upperparts much as Harlan's adult, and similar to dark western juvenile *calurus*, but usually blacker-looking than latter, with more obvious white/grey mottling on scapulars, and bicoloured wings having thinly dark-banded primaries and primary coverts more contrastingly paler than arms, where often also fairly obvious whitish-mottled greater-covert band, while dark tail-bars usually more wavy; below, body generally black with white throat and strongly white-streaked breast, often white barring on crissum, though underbody fully streaked on many individuals (and further variation ranges from white with narrow dark belly-band of streaks/spots to uniformly black, while some all black but for white-mottled belly), but underwing almost always shows white mottling on blackish coverts and moderately barred flight-feathers without adult Harlan's thick dark band on trailing edges, while outer primaries usually barred at tips, and again tail with many (up to about seven) dark wavy bars. **Juvenile Krider's Hawk** Differs from Krider's adult in having white tail with three or more thin dark end-bars (basal half sometimes also barred, presumably result of intergradation with *borealis/calurus*), and dark brown spots across belly, in addition to which upperwing more patterned with contrastingly paler outer wing. (See also figs. 45 and 48 on pp. 665 and 707.)

**CONFUSION SPECIES** Adults having rufous tail with narrow dark subterminal band unlikely to be confused, and dark inner leading edges of underwings confirm identification of flying adults, but juveniles and Harlan's and Krider's adults require care to distinguish from several other buteos. Pale-morph adult Ferruginous Hawk [208] can show rufous tail, dark markings on underwing-coverts and dark belly-band, but broader head, narrower wings with tapering hands more pointed, remiges below much whiter-looking with very small dark primary tips, lacks dark patagial marks and often (not always) dark subterminal tail-band, has completely feathered tarsi. Pale-morph juvenile Ferruginous can appear similar to juvenile Krider's Hawk but, apart from much broader head and different wing shape, shows little or no white spotting on upperparts, often dark

flank-line in flight, again fully feathered legs. Darkish adult Harlan's Hawk with greyish tail and white breast-streaking perhaps confusable with dark-morph adult Ferruginous Hawk (much plainer flight-leathers below without broad dark band on trailing edges, no dusky subterminal band on white tail, different wing shape, completely feathered tarsi); and darkest adult Harlan's with barred tail difficult to separate from dark-morph adult Rough-legged Buzzard [209], but that has narrower and longer wings (reach tail-tip when perched, fall somewhat short on Harlan's) and lacks whitish breast-streaking, as well as having fully feathered legs. Squarish pale primary-windows of mainly juvenile Red-tailed equally evident on juvenile Broad-winged Hawk [190], which also occurs in pale and dark morphs (but smaller, wing-tips more pointed, pale morph lacks dusky patch on inner forewing below, much rarer dark morph has distinctly broader dark subterminal tail-band). Pale morphs of other *buteos* lack Red-tailed's characteristic dark patch or band on inner leading edges of underwings; dark morphs of others lack rufous tail of dark-morph adult Red-tailed or greyish tail of dark Harlan's, or even-width narrow dark tail-bands and two-toned upperwings of dark juvenile Red-tailed.

**VOICE** Common call, used in variety of contexts by both sexes, both perched and in flight, is a long-drawn descending scream, *shreeeee*, 2-3+ seconds in length, rather sibilant and with slight initial rise (imitated by some other birds, especially, and expertly so, by Northern Mockingbird *Mimus polyglottos*); juvenile's call distinctly less rasping than adult's. In excitement, a loud and piercing *chuirk*, usually repeated, sometimes more rasping. Also conversational nasal grunts or duck-like quacks.

**FOOD** Mainly small to medium-sized mammals, with fewer birds, some reptiles and amphibians, occasionally fish, locally crustaceans, and large insects; carrion also taken. Mammals, which can form over 80% of diet, chiefly rodents such as microtine voles, *Peromyscus* mice, gophers *Thomomys*, and ground squirrels *Spermophilus* and arboreal squirrels, but also many rabbits and hares; thus, mostly small but ranging up to 2 kg. Birds include passerines and many gamebirds (especially quails *Colinus/Callipepla*), as well as waterfowl. While reptiles generally far less common in diet, snakes can be taken in large numbers where abundant, and lizards also regularly caught in Caribbean. On Socorro Island, where no mammals present, local race *socorroensis* feeds primarily on lizards, land crabs and birds. Carrion, taken mainly in winter, ranges from small roadkills up to domestic livestock. Predominantly still-hunter, watching from elevated perch and gliding down to take prey on ground, but also hunts aerially, using several methods: from hovering, kiting or circling, may dive steeply on to sighted quarry, often unsuccessfully; more commonly cruises 10-50 m up with flap-and-glide flight, or quarters harrier-like over ground, sometimes using trees, bushes or rocks for concealment before making surprise-attack; able to dodge among dense stands of trees like accipiter. In southernmost range hunts also in forest canopy. Recorded patrolling cave entrances at dusk, stooping on bats as they emerged. Will also forage on ground, especially for insects (e.g. grasshoppers, beetles) and other invertebrates, and regularly does so on Socorro.

On rare occasions, mainly in winter, pirates prey from other raptors, including conspecifics and other *buteos*.

**SOCIOSEXUAL BEHAVIOUR** Normally solitary or in pairs, but trios recorded with male provisioning two nests; often recorded singly on migration, too, though then and in winter sometimes in small loose groups, only exceptionally larger flocks. Frequent aerial displays, and soaring by one or more birds, often to great height, performed throughout year. In pre-nesting period, single or mutual high-circling with much calling, one or both of pair often dangling legs, at times touching each other's wings, and male's feet may touch female's back, she occasionally rolling over and presenting talons; food-pass reported rarely. Soaring bird may turn full 360° in rapid tight circle around wing-tip ('whirling'). Typical sky-dance involves male (sometimes female?) climbing high with deep beats and then diving precipitously on half-closed wings at great speed, checking, and shooting back up, or often plunging less steeply and repeating process in full rollercoaster across sky. Cartwheeling with interlocked talons seen occasionally in spring, almost always a territorial male expelling intruding male. On migration (but seemingly not on territory), male may circle at slow speed before partly closing wings, dropping legs with talons spread, and tilting from side to side. Conspicuous perched display, with fluffed-out breast-feathers, on prominent high branch.

**BREEDING** Late April-August, but mostly from June in Alaska and Canada, and earlier, from December/January, in south USA; prolonged season in Caribbean, November-July; dates for Mexico and Central America not reported. Large stick nest, 70-75 cm across, sometimes becoming still wider and deep with repeated use, lined with greenery, bark and rubbish, 5-35 m up in main fork of open-crowned tree, sometimes on Saguaro cactus, or on cliff ledge, and even on pole or other human structure, including urban buildings; occasionally lays in old nest of other *buteo* or Golden Eagle [224], or of corvid. Clutch 2-5 (1-4). Incubation c28-32 days, in Caribbean 32-34 days. Fledging c42-46 days and dependence 4+ weeks, but in Caribbean respective periods 45-49 days and up to 10 weeks.

**POPULATION** The most numerous *buteo* in most of its range, though relatively few exact data. Various estimates have put population at 350,000-500,000 individuals, but thought quite likely to exceed those figures, which, moreover, do not really take account of admittedly far smaller Central American populations. Recorded densities vary widely, from 1 pair/46 km<sup>2</sup> in Alaska (where also clusters of pairs with nests only 1.7-8 km apart) to as high as 1 pair/1.3 km<sup>2</sup> locally elsewhere, but average throughout range considered probably around 1 pair/5-10 km<sup>2</sup>. North American range covers some 12 million km<sup>2</sup> in total and if, say, a quarter of that area occupied, and a conservative density figure taken, then 300,000 pairs could be expected, which with addition of immatures would give total population of around 1 million individuals. Although this may seem high, it is worth considering that 450,000 Swainson's Hawks [198] have been counted on passage in southeast Mexico, yet Red-tailed appears at least as common as that species in western and central parts of America and has far greater range (widespread also in

*B. j. solitudinis* ♂ wing 357–383 mm, ♀ 397–412 mm; ♂ tail 213–230 mm, ♀ 250–252 mm. *B. j. jamaicensis* ♂ wing 330–339 mm, ♀ 350–371 mm; ♂ tail 189–202 mm, ♀ 204–214 mm. *B. j. kemsesi* ♂ wing 357–380 mm, ♀ 381–401 mm. *B. j. costaricensis* ♂ wing 368–377 mm, ♀ 397–410 mm; ♂ tail 207–217 mm, ♀ 222–239 mm. *B. j. socorroensis* ♂ wing 368–385 mm (two), ♀ 385–415 mm (two); ♂ tail 212–216 mm (two), ♀ 232 mm (one). *B. j. fumosus* ♂ wing 368–370 mm (two), ♀ 395 mm (one); ♂ tail 228–230 mm (two), ♀ 236 mm (one). **Weights** Few data: mean of 102 ♂s 1.03 kg, of 100 ♀s 1.22 kg (mostly *borealis* and *calurus*; Snyder & Wiley); average of 90 ♂s 957 g, of 113 ♀s 1.15 kg (presumably *calurus*; Steenhof). ♀ *socorroensis* 1.26 kg (one). Large overlap between sexes.

**REFERENCES** Austing (1964), Bildstein (1978), Blake (1977), Böhm (1978), Brinker & Erdman (1985), Clark & Wheeler (1987), Conner (1974), Fitch *et al.* (1946), Gates (1972), Hardy (1939), Henny & Wight (1972), Hoffman *et al.* (1992), Houston & Bechard (1985), Howell & Webb (1995), Janes (1984), Jehl & Parkes (1982), Johnsgard (1990), Johnson (1973, 1986), Knight & Erickson (1976), Lish & Voelker (1986), Luttich *et al.* (1971), Mader (1978), Mindell (1985), Palmer (1988), Preston (1990), Preston & Beane (1993), Raffaele *et al.* (1988), Ridgely & Gwynne (1989), Rothfels & Lein (1983), Santana & Temple (1988), Santana *et al.* (1986), Slud (1964), Snyder & Snyder (1991), Snyder & Wiley (1976), Steenhof (1985a), Stiles & Skutch (1989), Tavernier (1927), Tinn & Fuller (1990), Todd (1950), Wetmore (1965), Wheeler (*in litt.*, 2000), Wheeler & Clark (1995), Wiley (1975).

**203 COMMON BUZZARD (including STEPPE)**  
*Buteo buteo* (Linnaeus, 1758)

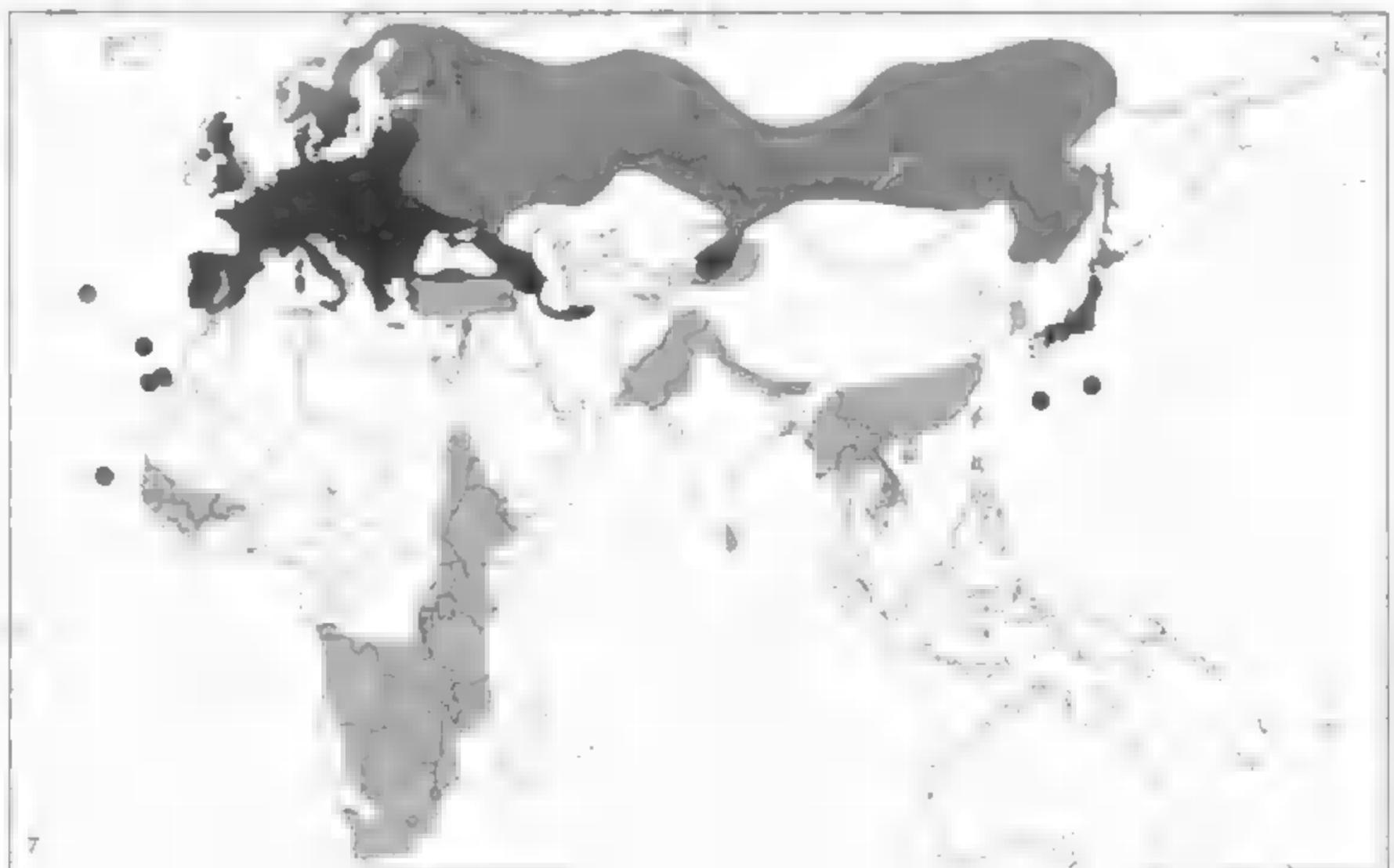
**Plate 69**

Other names: Buzzard, Eurasian Buzzard, Steppe/Desert Buzzard (east European/west-central Asiatic races), Siberian/Japanese Buzzard (east Asiatic races)

**DISTRIBUTION** Palearctic and marginally Indomalayan (67°N to 15°N) but, in northern winter, also Afrotropical and Indomalayan (59°N to 35°S); order 7; locally rare, but generally common and throughout much of range one of most numerous raptors. Atlantic islands, Europe and Asia: breeds Cape Verdes, Canaries, Madeira, Azores, and much of Europe (not Iceland) from Iberia, France, Northern Ireland and Britain eastwards, north to southern Norway and north-central Sweden, Finland and Russia, and south to larger Mediterranean islands (Corsica, Sardinia, Sicily, Crete) and Caucasus; also breeds right across Asia to Sakhalin and much of Japan, north to southern Siberia and at least

western coast of Sea of Okhotsk, and south to western and northern Turkey, Caspian Iran, Kazakhstan, Tien Shan, Altai, northern Mongolia, Manchuria, Ussuriland and, in Japan, Hokkaido, Honshu and Shikoku, as well as Minami-daito (Borodinos) and Haha-jima (Bonins); limits of isolated population in southern China, Tibet and Himalayas unclear.

**MOVEMENTS** Populations of east Atlantic, Mediterranean and small Japanese islands all sedentary, some having evolved through geographical isolation into distinct races; those of central and west Europe north to southern Norway and Sweden, east to Poland, southern Ukraine, Caucasus and northern Iran, and south to Turkey, as well as of eastern Himalayas and main Japanese islands of Honshu and Shikoku, sedentary or partially migratory; north and east European and most



head, greyish-brown to brown back and wing-coverts (usually with uneven rufous or rusty-buff fringes on mantle and coverts), slightly darker secondaries with blackish trailing edges (like nominate *buteo*, but often much bolder whitish patch on primaries), and more or less rufous tail (sometimes bright rufous) which may be plain but more usually, as on adult nominate *buteo*, shows many narrow dark bars and a broader subterminal band; below, whole body and wing-linings vary from uniform to patterned rufous (any patterning variable but broadly similar to that of nominate *buteo*, with rufous chest and often thighs, sometimes also flanks, and with pale U across breast, pale band along median coverts, and often pale belly and crissum, while dusky or rufous barring on these paler areas is generally finer, neater and more distinct), and undertail paler rufous than uppertail; below, too, whitish flight-feathers, finely dark-banded on secondaries, contrast more markedly than on nominate *buteo* with the bold blackish band along the trailing edges. **Adult pale-morph *vulpinus*** Predominantly westerly morph which can show very little or no rufous, though this colour often present on end of tail and sometimes on thighs and patagia; generally grey-brown above (usually paler than most nominate *buteo*) apart from greyish or partly rufous tail patterned with the thin dark bars and broader subterminal band typical of adults of the species as a whole (darker trailing wing-edges more obvious on upperside of this morph, and pale patches of primaries and base of tail also often conspicuous, while upperwing-coverts unevenly mottled with lighter feather-fringes); below, like rufous morph, much contrast between whitish flight-feathers, finely dark-banded on secondaries, and bold blackish band along the trailing edges, also greyish or streaky head to chest and fine dark barring on wing-linings and on greyish-white lower breast/belly. **Adult dark-morph *vulpinus*** Predominantly easterly (and generally rarest) morph varies above from grey-brown (hardly darker than mantle and wing-coverts of rufous and pale morphs) to blackish-brown or even black, while grey or grey-and-rufous tail has distinct dark barring and usually particularly broad subterminal band; below, underbody and wing-linings vary from uniformly rich rufous-brown through blackish-brown to almost black, further emphasising contrast between finely dark-banded white of flight-feathers and broad blackish trailing wing-edges which, with subterminal tail-band, are strongest on this morph; carpal patches are sometimes also more solidly blackish than in the other two morphs. **Juvenile *vulpinus*** Apart from having narrower wings (especially hands) and longer thinner-looking tail, all morphs readily distinguished from adults by evenly barred tail without broad subterminal band, much less sharply defined trailing wing-edges, generally streaking in some form on breast and in band along median underwing-coverts, and neat and even form of pale fringes to upperwing-coverts in fresh plumage; if visible in good conditions at close ranges, pale eyes also diagnostic of immaturity. In fact, only dark-morph juvenile resembles adult in general colouring, being dark grey-brown above and rich rufous-brown below; although typical rufous-morph juvenile is rufous-buff below with reddish-brown streaks and typical pale-morph juvenile tends to be creamy-buff below with grey-brown streaks, there is much overlap and less rufous

individuals in particular closely resemble many juveniles of nominate *buteo* in plumage. **Adult *japonicus*** From above, not much different from typical nominate *buteo* (and proportions similar, too), although head generally somewhat paler brown than mantle, and brown tail plain or just faintly barred (no obvious subterminal band) and often with grey-white base; rather pale-looking below, whitish to creamy-buff underbody being variably streaked from cheeks to breast (leaving plain throat) and with belly-band of bars or blotches that extend to flanks, but plain whitish thighs (emphasised by the feathering extending farther on to upper tarsi) and crissum and, typically, pale buff underwings (with contrasting dark carpal arcs and primary tips) reinforce general pale appearance, though sometimes wing-linings darker anteriorly and contrasting with paler creamy median coverts. **Juvenile *japonicus*** Like other races, differs from adult in narrower wings and thinner-looking longer tail, and more streaked (not barred or blotched) underbody, and, unlike most adult *japonicus*, wing-linings usually also streaked, and tail (both surfaces) shows many thin but distinct bars on often reddish-buff ground colour; pale eyes may be visible at closer ranges.

**CONFUSION SPECIES** Because it is among most widespread of Palearctic birds of prey, which during northern winters also ranges over significant parts of Afrotropical and Indomalayan regions, because it is medium-sized and, especially, because it is not only polymorphic but also individually highly variable, this is a key species in Old World raptor identification. It can be confused with many others. In Palearctic, distant dark individuals are sometimes even misidentified by inexperienced or over-enthusiastic observers for the much larger and quite differently proportioned Golden Eagle [224]. Dark birds also bear some resemblance to juvenile Northern Marsh Harrier [100] (also soars on V wings, but narrower wings, longer tail, different flight action), and to dark-morph Booted Eagle [230] (soars on level and more parallel-edged wings, tail longer and squarer-tipped, flight-feathers uniformly dark except for whitish wedge only on inner primaries below). Pale individuals likewise sometimes confused with pale-morph Booted Eagle (same differences, and no black carpal patches), and even with Short-toed Snake-eagle [67] (significantly larger, with obviously big head when perched, longer wings fairly level when soaring and distinctively bowed when gliding, also relatively pale wing-ups and trailing edges, no carpal patches). Because the word 'Buzzard' also appears in their traditionally used vernacular names (sometimes as 'Buzzard-eagle', though that is an even more confusing alternative), mention must also be made here of the four hawks of the genus *Buteo* – in Africa, Grasshopper Buzzard-hawk [159]; in Indian subcontinent, White-eyed Buzzard-hawk [161]; and in east and southeast Asia, Rufous-winged and Grey-faced Buzzard-hawks [160, 162] – but all are quite distinct (smaller, slimmer and more attenuated in shape, often perching more horizontally with wings at or exceeding tail-tip; in flight, slim with narrower, relatively longer and more pointed wings and longer thinner tail, buoyant action and gliding low like harriers but with wings flattish – but remember that juvenile Common Buzzards of all main races are slimmer, narrower-winged and longer-tailed than adults). See also Lizard Buzzard [163] in

brownish tail, and dark morph is blackish-brown with black-barréd tail. (Variation further complicated in west of range through extensive interbreeding with nominate *buteo*: specimens from zone of intergradation between nominate *buteo* and *vulpinus* – which runs from north Sweden and Finland through Baltic states, west Russia, west Ukraine and east Romania – have in past been subspecifically distinguished as 'intermedius' and 'zimmermannae', but these intermediate birds are commonest in the areas where the grey-brown morph predominates.) *B. b. menetriesi* (southern Crimea and Caucasus to Caspian Iran, perhaps Turkey; usually described as sedentary, but regarded by Mackworth-Praed & Grant also to be a Palearctic winter migrant to east and South Africa, 'not usually common') Averages larger again; generally duller and less rufous, paler below, less reddish on tail.

*B. b. refectus* (mountains of west China to Tibet and adjacent Himalayas; sedentary, or altitudinal or short-distance migrant) Averages larger still, wings less rounded; mainly dark brown to rufous-brown, variably white below; tawny-brown to brown tail, plain or only faintly darker-barréd, and, on underwings, bold white primary-patches and rather extensive dark carpals combine with less rounded wings to give some resemblance to Long-legged Buzzard [206].

#### *Japonicus* group

*B. b. japonicus* (east Siberia from 108°E and north Mongolia through Transbaikalia, Amurland, Manchuria and Ussuriland to Sakhalin, southern Kuriles and Japan; partly sedentary, but mainly migratory, wintering from Korea and Japan south through southern China to Indian region, southeast Asia and north Philippines) Averages larger than *vulpinus*, nearer size of nominate *buteo*, with more extensively feathered tarsi; much browner, far less rufous, typically with pale head, whitish underparts variably streaked on breast, often brown patch on belly and thighs, tail dark grey-brown with variable barring and often greyish-white base.

*B. b. toyoshimai* (Seven Islands of Izu and Bonin Islands) Smaller than *japonicus*, with shorter and more rounded wing-tips; distinctly paler.

*B. b. oshiroi* (Daito-jima) On basis of single (apparent male) individual, clearly smaller than

*japonicus*, shorter-winged; darker and redder, tail more distinctly barréd (see Kuroda).

**MEASUREMENTS *Buteo* group** *B. b. buteo* ♂ wing 350–418 mm, ♀ 374–432 mm; ♂ tail 194–223 mm, ♀ 193–236 mm; ♂♀ tarsus 69–83 mm. *B. b. bannermani* ♂ wing 380 mm (one), ♀ 375–412 mm (three). *B. b. insularum* ♂ wing 352–390 mm, ♀ 370–394 mm. *B. b. rothschildi* ♂ wing 343–365 mm, ♀ 362–393 mm. *B. b. arrigonii* ♂ wing 343–382 mm, ♀ 352–390 mm. ***Vulpinus* group** *B. b. vulpinus* ♂ wing 335–377 mm, ♀ 358–397 mm; ♂ tail 170–200 mm, ♀ 175–209 mm; ♂♀ tarsus 69–82 mm. *B. b. menetriesi* ♂ wing 351–397 mm, ♀ 372–413 mm. ***Japonicus* group** *B. b. japonicus* ♂ wing 362–400 mm, ♀ 370–408 mm; ♂♀ tail 191–235 mm; ♂♀ tarsus 64–77 mm. *B. b. toyoshimai* ♂ wing 341–356 mm (three), ♀ 356–375 mm (four). *B. b. oshiroi* wing 330 mm, tarsus 64 mm (one, probably ♂). **Weights** *B. b. buteo* ♂ 427 g–1.18 kg, ♀ 486 g–1.36 kg. *B. b. vulpinus* ♂ 560–675 g, ♀ 710 g–1.18 kg. *B. b. japonicus* ♂ 630–810 g, ♀ 515–970 g.

**REFERENCES** Ali & Ripley (1978), Bährman (1969), Beaman & Madge (1998), Beklova & Pikula (1988), Bernis (1966b), Brazil (1991), Brazil & Hanama (1991), Broekhuysen & Siegfried (1970, 1971), Brogius (1966), Brown (1976c), Brown *et al.* (1982), Clements (2000), Clouet & Wink (2000), Cramp & Simmons (1980), Dare (1957), Dementiev & Gladkov (1951), de Wavrin (1969), Dittich (1985), Doherty (1992), Etchepare & Hue (1978), Flint *et al.* (1984), Forsman (1999), Froehlich & Kneitz (1990), Genschel (1986, 1995), Glutz von Blotzheim *et al.* (1971), Goshman *et al.* (1989), Grinnett *et al.* (1998), Hagemeyer & Blair (1997), Halley (1995), Handrinos & Akriou (1997), Handrinos & Demetropoulos (1983), Hayman (1970), Holstein (1956), Hou *et al.* (1980), Hubert (1995), Inskipp & Inskipp (1991), James (1984, 1988), Kemp & Kemp (1998), Kjellén (1992), Kostzewa & Kostzewa (1994), Kuroda (1971), Mackworth-Praed & Grant (1957), Martins & Porter (1996), Mebs (1964), Møller (1977), Moore (1957), Moreau (1972), Newton *et al.* (1982), Picozzi & Weir (1976), Portenko (1929), Porter & Willis (1968) Porter *et al.* (1981, 1996), Rasmussen & Storgård (1989), Roberts (1991), Rothenbach (1975), Rogacheva (1992), Saurola (1977), Schmitt *et al.* (1980), Shirihai (1996), Shirihai & Christie (1992), Shirihai & Doherty (1990), Shirihai & Forsman (1991), Shirihai *et al.* (1996), Steyn (1982), Svensson (1976, 1981), Svensson *et al.* (1999), Sjöén (1978), Thiollay (1967a), Tubbs (1972, 1974), Ulfstrand (1970, 1977), Utendörfer (1939, 1952), van Marle & Voous (1988), Vaurie (1965), Vitzery (2000), Weir & Picozzi (1975), Welch & Welch (1988), Wink (1998), Witherby *et al.* (1939)

## 204 MOUNTAIN BUZZARD

*Buteo oreophilus* Hartert & Neumann, 1914

Plate 71

Other names: Forest or Woodland Buzzard (South Africa), African Buzzard

**DISTRIBUTION** Afrotropical (11°N to 35°S); order 4+; rather uncommon to locally fairly common, but very patchy distribution. Eastern and southern Africa: highlands of central Ethiopia, southern Sudan, eastern DR Congo, southwest and northeast Uganda, west and central Kenya, northeast and south Tanzania, and borders of northeastern Zambia and north Malawi; and both lowlands and uplands of southern South Africa,

mainly along a subcoastal strip from Cape Town to about Alexandria, northeast of Port Elizabeth (but see Movements). With their breeding distributions separated by some 2,500 m, eastern and southern populations are perhaps also sufficiently distinct to merit treatment as allospecies – Mountain Buzzard *B. oreophilus* and Forest Buzzard, *B. trizonatus* Rudebeck, 1957 – within a superspecies that also includes Common Buzzard [203] and Madagascar Buzzard [205]; so differences in plumage, habitat and behaviour are mentioned throughout.

branches; wings short of tail-tip (on adult, by about width of subterminal dark band). Sexes alike, female averaging only 2% larger (but can look noticeably bigger when pair seen together); juvenile separable in good view, especially in flight; moults to adult plumage in first year. **PERCHED Adult** Variable, but generally brown to dark brown above, sometimes greyer on head, with broadly dark-banded grey-brown tail; and basically white below, but throat streaked, flanks heavily brown-blotched and chest almost solidly so, and thighs usually dark-banded rufous, thus leaving only lower breast and belly mainly white. **Juvenile** Similar, but more evenly blotched below, without solidly dark chest or white lower breast; rufous thighs lightly marked; tail thinly barred. **Bare parts** Adult eyes yellow, juvenile orange-brown [cf. 203]. Adult cere yellowish-blue, juvenile yellower. Adult legs yellowish-white, juvenile paler yellow.

**FLIGHT** Medium-sized raptor with compact shape, short broad head and neck, fairly broad rounded wings, shortish tail; wingspan 2.4 times total length. Beats apparently even stiffer and shallower than Common Buzzard [203]; similarly glides on flat wings, carpals pressed forward, and soars with wings slightly raised. **Adult** Dark above but for clearly banded tail usually with some white mottling showing at base; below, dark head and chest, blotched flanks and barred thighs are all echoed on the wing-linings by dark leading edges, blotched median coverts and barred greater; barred greyish flight-feathers with whitish patch at bases of primaries, and dark-tipped secondaries forming dark trailing edges corresponding to slightly broader subterminal band on barred tail. **Juvenile** Like adult above except for thinly barred tail, but less contrastingly marked below, with wing-linings blotched much as underbody, no dark forearms or trailing edges, and evenly barred tail.

**CONFUSION SPECIES** No other resident Madagascan raptor resembles this typical buteo; Madagascar Cuckoo-hawk [10], usually cited as confusion species, is slimmer, smaller-headed, thinner-winged and longer-tailed, with dark breast-band, evenly mottled wing-linings and three-banded tail. But Steppe Buzzard, one highly migratory north Eurasian race of Common Buzzard [203], is widespread migrant through eastern and southern Africa during October-March and could conceivably reach Madagascar; again very variable and, though some plumages easily distinguished, others more difficult.

**VOICE** Ringing *creeee* or *peo-oooooo*, often in flight, sometimes when perched, and variously described as

'screaming', 'piercing', 'mewing' and 'plaintive'. Clearly corresponds to main calls of Common Buzzard [203] and other buteos.

**FOOD** Apparently chiefly small vertebrates, including amphibians, lizards, snakes, rodents, some small (or young) birds; also crabs, occasionally carrion. Said to be particularly attracted to swarming locusts, but no references to other invertebrates as prey. Like many buteos, catches most food on ground. Mainly still-hunts from conspicuous perch, gliding down on to located prey, but also pounces from flight.

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in pairs. Frequently soars for long periods, often mutually, and display-flights perhaps correspond to those of Common Buzzard [203] and other buteos.

**BREEDING** September/October-January/February. Stick structure, lined with green leaves, at 10-15+ m in tree (especially one growing on steep slope), usually in large fork or based on epiphytic growth; occasionally on rocky crag. Clutch 2 (1-2). Incubation 34-37 days. Fledging 39-51 days.

**POPULATION** Few data on densities: roadside counts over 2,524 km yielded average of 1 bird/56.1 km, while 1991-93 study on west coast of Masoala peninsula located minima of eight nesting pairs in 10.2 km<sup>2</sup> and six pairs in 11.7 km<sup>2</sup>, giving c1 pair/1.3-2 km<sup>2</sup>, with combined inter-nest distances of 0.5-1.2 km. Although this unusually high density not likely over rest of range, species uses at least 400,000 km<sup>2</sup> of variably suitable habitat and, from comparison with Common Buzzards [203] in Europe, a population of tens of thousands seems safe to assume. Locally common and adaptable; apparently not currently at risk, but may perhaps in long term prove more sensitive to larger-scale habitat changes that continue throughout Madagascar.

**GEOGRAPHICAL VARIATION** Monotypic. Sometimes treated as conspecific with widespread Old World Common Buzzard [203], but best regarded as forming a superspecies with that and African Mountain Buzzard [204]. (See also comment in Geographical Variation under Red-tailed Hawk [202].)

**MEASUREMENTS** ♂ wing 290-336 mm, ♀ 293-346 mm; ♂ tail 164-196 mm, ♀ 169-194 mm; ♂ tarsus 62-82 mm, ♀ 64-82 mm. **Weights** No data.

**REFERENCES** Benson *et al.* (1976), Berkelman (1993, 1994, 1995, 1996), Dec (1986), Langrand (1990), Langrand & Meyburg (1984), Milon *et al.* (1973), Siegfried & Frost (1973).

## 206 LONG-LEGGED BUZZARD

*Buteo rufinus* (Cretzschmar, 1927)

Plate 70

**DISTRIBUTION** Palearctic and, marginally when breeding but somewhat more widely in winter, Afro-tropical and Indomalayan (c33°N to 13°N, in winter mostly 44°N to 5°N); order 6; rather common to locally uncommon or scarce and, while some decline in parts of western range and increase in others, generally stable. Breeds north Africa, southeast Europe, Arabia and southwest and central Asia, though precise limits uncertain in some areas: in Africa from northwest Mauritania

north to Morocco, Algeria (including few scattered sites south well into Sahara) and in north across to Egypt, and parts of north, south and east Arabia; and, apart from rather isolated populations in Hungary (handful, since early 1990s) and southern Ukraine, breeds in southeast Europe in Romania (south Dobrudja), Bulgaria, possibly south Serbia, and Macedonia, Albania, Greece (including several islands), Cyprus (few, possibly irregular), through Turkey (but see Geographical

Variation under Common Buzzard (203), with southward extension through Levant (south to Sinai and Jordan), and eastward through north Iraq and down across south-central Iran to west Afghanistan, while farther north range extends into Transcaucasus and north and south around Caspian Sea, thence eastward through Kazakhstan (north to southern Urals and upper reaches of river Irtysh) to northwest Mongolia, reaching south to Turkmenia and north Iran and, apparently, northern Afghanistan and, in east, down through Dzungaria and northwest China (west Sinkiang); small, seemingly disjunct population also in north Indian subcontinent (north Pakistan, Kashmir and north Uttar Pradesh).



**MOVEMENTS** North African *citensis* largely sedentary with some short-range dispersal, though wanderers occasionally recorded in Iberia, and one recovered in Senegal in October indicates that, rarely, longer southward movements occur; old record from Cape Verde requires confirmation, and several records south to Burkina and Nigerian coast (at Lagos), while not assigned to subspecies, seem more likely to have involved migratory nominate race. Latter more or less resident in south but almost wholly migratory in north and east of range, leaving breeding areas from late August through September; migrants travel singly or in small flocks, and only small numbers counted at regular migration watch-points such as Suez (1,816 reported there in September-early November 1981 though possibly exaggeration, since very few seen in Israel in autumn; see also Confusion Species) and south Red Sea strait of Bah al Mandab (autumn total up to c130); majority winter in southern part of breeding range from eastern Mediterranean (Greece, Asia Minor) through Middle East and Arabia to southern Tibet and northern Indian subcontinent, few extending farther south (vagrants have reached Sri Lanka and, farther east, northern Burma and Andaman Islands), but in west moderate numbers continue into Africa, where most apparently remain in Nile valley in Sudan with some spreading farther west; evidently rare south of Sahara, with mere score or two of records but including isolated occurrence as far south as 10°S in Zambia in November, while specimens of nominate race collected west to Niger (November) and even Senegal (December; note that both races have thus reached that country) could suggest either long westward flight from northeast Africa or more direct crossing of Sahara from Mediterranean coast, as also might West African records of racially unidentified individuals mentioned above.

Spring return from late February, peaking second half March, with even fewer seen along main raptor migration routes (e.g. seasonal maximum at Eilat 105), and breeding areas reoccupied mostly March-mid April/May. Wanderers increasingly recorded north of breeding range in Europe, even near North Sea coast and in Finland.

**HABITAT** Open, arid, uncultivated country with suitable crags or gorges for nesting, to lesser extent also forested hills and open lowland woodland, normally with access to fresh water: mainly steppe, semi-desert and desert edges, and barren rocky or stony landscapes, including dry scrubland, and locally even along sea coasts in southeast Europe, but also adapts to wooded areas so long as these either fairly open and not too continuous or have sizeable clearings. Forages over similar habitats, as well as cultivation and pasture, and sometimes even more heavily farmed areas, though still preferring relatively undisturbed habitats, and in winter range also hunts over grassland. Sea-level to c1,600 m in Europe; not uncommonly in mountains to 3,000+ m in Asia, where recorded to 3,900 m, and on passage to 5,000 m in Nepal.

**FIELD CHARACTERS** Comparatively large, sturdy buteo, highly variable in plumage from creamy and rufous to almost all blackish (African *citensis* much smaller, and never blackish; see Geographical Variation), with large bill on smallish head, long wings and rather long tail, relatively long legs with powerful feet. Sluggish; perches openly and prominently, and upright, at times for lengthy period, on rock, crag or similar vantage with good commanding view, sometimes on tree, or on artificial site such as pylon or telegraph pole when no other available, and often on ground, where walks slowly with somewhat waddling gait; wings two-thirds or more down tail. Polymorphic, with three or four plumage types. Sexes similar, but female up to c15% larger and averaging over 30% heavier; juvenile reasonably distinct; as adult after two to three years, when probably first breeds.

**PERCHED Plumages** Highly variable, occurring in three or four plumage types which, with additional intermediates, by no means always clearly distinguishable, and some individuals not assignable to a particular type; though all four described here, species would perhaps be better treated as dimorphic (pale, dark), or in three morphs (pale, rufous, dark) of which pale the most variable. (Note that dark morph not known for *citensis*.)

**Pale adult** Rather plain pale head creamy-rufous to light sandy-tinged with at most few dark streaks on crown, dark line through eye and, usually, heavier-streaked or more solidly darker nape; dark brown upperparts with sandy-buff fringes and, more conspicuously, sandier mantle and wing-coverts with darker feather-centres contrasting darker brown flight-feathers, and light orangey-rufous tail on which whiter base sometimes visible even when perched; pale of head continues down to breast, where usually thinly pencil-streaked, lower breast often more streaked, while flanks/trousers and belly more noticeably darker rufous. **Intermediate adult** Differs from pale adult only in somewhat richer coloration, darker upperparts (narrower fringes more rufous) and slightly darker and more patterned breast, but individual variation makes distinction from pale adult

ones; some also still have few juvenile middle secondaries, which are shorter than surrounding new ones and lack distinct dark tip.

**CONFUSION SPECIES** Although typical palest individuals reasonably distinctive, the highly variable plumage leads to overlap in characters with several other *buteos*. Main confusion in most of nominate race's range is with even more variable Common Buzzard [203], mainly of highly migratory race *vulpinus* (Steppe Buzzard), as that occurs through much of same areas on passage and in winter, as well as in northeast of its range in Asia when breeding. Steppe often distinguishable by various plumage features (e.g. darker head and chest with contrasting paler breast-band, fully barred darker uppertail, less distinct carpal patches both above and below, more contrasted wing-linings with median coverts paler, greater's darkest), but variation in both *buteos*, combined with often inadequate view, means that many Steppe not easily or reliably separated by plumage, and then need to be identified by more constant characters such as, especially, smaller size, different proportions (shorter wings and tail, smaller bill on less protruding head) and flight action (faster beats stiffer, less flexible), different wing positions (almost flat in glide, shallower V with less upcurved ends in soar), as well as, when soaring, faster progress in tighter circles; moreover, darker morphs of both species so similar that identification has to be based on differences in size/proportions and in wing actions/positions as outlined above; further, Long-legged's smaller African race *cirtensis* much closer to Steppe in size/proportions, and some plumages of those two perhaps all but impossible to separate. Major pitfall species in Asia, sometimes considered conspecific with Long-legged but better treated as *allospecies* (see Geographical Variation), is Upland Buzzard [207], which averages slightly bigger and narrower-winged, typically has large white patch on hand above, uniform-looking greyish-white tail (two to three fine bars near tip visible in close view), dark brown streaking on breast, dark brown on thighs forming dark U, and no rufous tones on tail or undersurfaces; its dark (blackish) morph, however, though having darker ground colour on undersecondaries and sometimes pale U on breast, is otherwise indistinguishable in plumage from dark Long-legged. Only other *buteo* likely to be confused, and then only in non-breeding season (and only in Long-legged's northern range), is migrant Rough-legged Buzzard [209], similar in size, proportions and flight behaviour (including frequent and persistent hovering), but that should normally be readily distinguishable by distinctive white-based tail with broad dark subterminal band, as well as fully feathered legs (and juvenile lacks dark underwing-diagonals of many juvenile Long-legged Buzzards).

**VOICE** Not very vocal, though can be so in display (see Sociosexual Behaviour), and noticeably less noisy than Common Buzzard [203]. Calls very like latter's, if a little shorter and sounding slightly higher, though any true differences masked by individual variation according to degree of excitement. Commonest call thus a short mew, dropping in pitch. Bird leaving nest in Morocco just after sunrise said to have repeated an *ar* note, shorter, fuller and, apparently, lower than Common Buzzard's and with less marked fall in pitch.

**FOOD** Primarily small to medium-sized mammals, reptiles, birds and large insects, proportions of each varying with local availability; fewer amphibians; some carrion taken in winter. Mammals can form up to 85% of diet, include many gerbils *Meriones*, pikas *Ochotona* and microtine voles, but also rats, mice and lagomorphs, as well as ground-squirrels, hedgehogs and others. Reptiles frequent (locally to 30–40% of prey taken), mostly lizards such as *Uromastix* and *Agama*, but snakes also commonly caught. Generally fewer birds, mainly small ones e.g. larks (Alaudidae), though ranging in size up to gamebirds and Short-eared Owl *Asio flammeus*; injured waterfowl sometimes taken and, locally, domestic poultry grabbed, both mainly in non-breeding season. Insects may be important at times, especially if numerous, when many orthopterans and beetles eaten. Often still-hunts from tallish or high perch, or lower mound, scanning ground for long periods, or watches while standing on ground, where also stalks prey and waits at entrances to rodent burrows; but equally likely to forage from air by circling at c30 m, at times soaring higher, regularly hovering or hanging in wind for minutes on end, dropping stepwise before making short stoop. Attends fires to snatch fleeing animals, though normally less evident there than many other raptors.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs or family groups, but occasionally forms very loose breeding groups, and at times several nests fairly close together (c300 m) on same crag; more gregarious on passage, when small groups or, rarely, larger flocks. Aerial displays, similar to but less well known than Common Buzzard's [203], include single and mutual high-circling, male and female diving at each other, and impressive sky-dance by male in which he circles up before plunging on part-closed wings, swoops up again and, after tilting or even looping the loop at zenith, drops near-vertically, repeating dance one or more times; latter display, as well as male soaring high above perched calling female (B&A), often accompanied by frequent calls.

**BREEDING** March–July, but from January/February in coastal Morocco and Middle East. Large pile of sticks and branches, c80 cm across and 30–55 cm deep, lined with green leaves, twigs, straw and wool, on cliff ledge, crag or low rock and often partially shaded, less frequently on ground on, usually, steep slope, occasionally in tree; at times uses old nest of other large bird. Clutch 3–4 (2–5). Incubation 28–30 days. Fledging c40–46 days; period of dependence uncertain, at least 1 month, probably longer.

**POPULATION** Some decline recorded in western Russia, but recent increase in parts of Europe, mainly Bulgaria, from where expanding population and attendant post-breeding dispersal has enabled northward extension of range into Hungarian steppes. Latest (mostly 1990s) estimates suggest total West Palearctic population between 5,000 and 15,000 breeding pairs. In Europe, apart from 800–1,500 in Russia, c350–450 pairs made up mostly by Bulgarian population (c300), with up to c50 each in Greece and Ukraine and smaller numbers in Albania and few other countries; some 300 pairs in Israel, having recovered from depletion through pesticide poisoning in 1950s, while Turkish population put at 1,000–10,000 pairs and in fact probably around

(beetles, grasshoppers), other invertebrates; but said not to take carrion. Mammals mainly rodents, such as voles, gerbils *Meriones*, sousliks *Spermophilus* and young marmots *Marmota*, but also lagomorphs (pikas *Ochotona*, especially in Tibet, and young hares); birds include pipits *Anthus* and other terrestrial passerines, occasionally even grouse. Like other buteos, forages by random soaring over open areas and still-hunts from rock or other perch, in either case dropping down on to prey on ground; catches invertebrates on foot.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Much single and mutual high-circling, 'often parachuting gently with wings held above the back'; male will dive at female, and talon-grappling also recorded.

**BREEDING** May–July (April–August). Small stick nest, c30 cm across, lined with wool, hair, grass, dry dung, on cliff ledge, rock outcrop, high river bank, talus or scree slope, even steep grass slope, often under overhang or rock, or sheltered by bush. Clutch 3–4 (2–5). Incubation c30 days. Fledging c45 days.

**POPULATION** Distributional limits not always clear, particularly in west through confusion with Long-legged Buzzard [206], but breeding range must enclose at very least 5 million km<sup>2</sup>. Subjective assessments in both breeding and winter quarters vary from 'common' (or

even 'abundant') to 'rare'. Numbers probably fluctuate in response to vole populations, but it seems unlikely that an open-country buteo with such an extensive distribution would not total at least five figures, achievable by an average density of probably less than 1 pair/1,000 km<sup>2</sup>. Six figures might thus need nearer 1 pair/100 km<sup>2</sup>, in which connection it is noteworthy that 'there is normally a pair to 15–70 square miles [roughly 40–180 km<sup>2</sup>], but in really suitable areas two pairs may breed only 50 yards apart...probably to some extent controlled by available breeding sites' (B&A).

**GEOGRAPHICAL VARIATION** Monotypic, but dimorphic and variable. Closely related to Long-legged Buzzard [206], with which forms a superspecies: used to be considered conspecific, but breeding ranges overlap in eastern Tien Shan to Mongolia.

**MEASUREMENTS** ♂ wing 429–480 mm, ♀ 485–510 mm; ♂♀ tail 255–282 mm, tarsus 81–90 mm. **Weights** ♂ 950–1.4 kg (two), ♀ 970 g–2.05 kg (three).

**REFERENCES** Ali & Ripley (1978), Brazil (1991), Brazil & Hanawa (1991), Cheng Tso-hsin (1987), Dementiev & Gladkov (1951), Etchécupar & Húe (1970), Flint *et al.* (1984), Grimmett *et al.* (1998), Inskipp & Inskipp (1991), King *et al.* (1975), Knyshtautas (1993), Liu Huan-jin (1986), Meyer de Schauensee (1984), Popov & Verzhutskii (1990), Rogacheva (1992), Zhang Xiao-ai (1984).

## 208 FERRUGINOUS HAWK

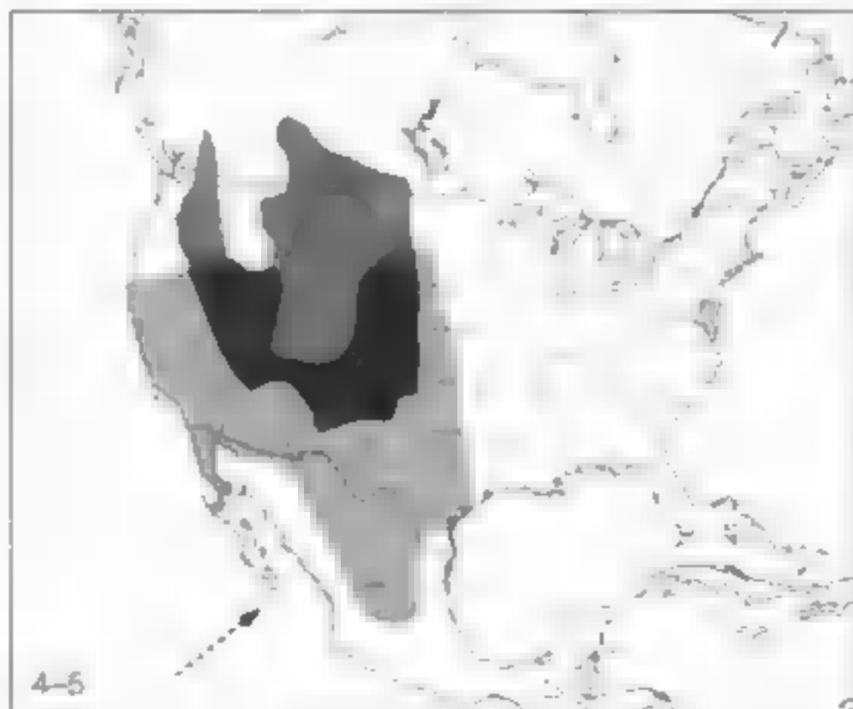
*Buteo regalis* (GR Gray, 1844)

Plate 66

Other names: Ferruginous Roughleg/Rough-legged Hawk

Proposed name: Ferruginous Buzzard

**DISTRIBUTION** Nearctic (summer 53°N to 33°N, winter 45°N to 22°N); order 4–5; still not uncommon in rather restricted range. Western North America: breeds southwest Canada (southern areas of British Columbia, Alberta and Saskatchewan, and extreme southwest Manitoba) and western USA (east to western parts of Dakotas, Nebraska and Kansas, northwest Oklahoma, and south to southeast Nevada and northern Arizona and New Mexico into northwest Texas).



**MOVEMENTS** Almost entirely migratory in north of breeding range, partially so or sedentary farther south. Winters in southwest and west-central USA (southward from north California, southeast Oregon, south Idaho, Utah, south and east Colorado, southeast Wyoming and south Dakota, east through much of Nebraska, Kansas, Oklahoma and Texas) and, during October–early April, in north and central Mexico (south frequently to northern half of Baja California, north Sonora, south Chihuahua, east Durango, Coahuila and northern Tamaulipas, more irregularly down to northeast Jalisco, Guanajuato, San Luis Potosí and western Tamaulipas). Thus, winters in southern half of breeding range, as well as to west, slightly to east, and well to south; some Canadian birds reach Mexico, while those from Alberta winter regularly in Texas, having travelled over 2,000 km mainly across the Plains. Not uncommonly recorded on passage, and occasionally even in winter, in Minnesota and Wisconsin, more casually east to Ohio, New Jersey, Virginia, Tennessee and Florida; in Mexico, vagrants have reached southernmost Baja California and as far south on the central plateau as Hidalgo.

**HABITAT** Plains, prairies, desert uplands, and other dry open country, sometimes with cliffs or rocky outcrops, also extending to edge of pine-juniper zone. Winters additionally in open woodland, around plantations, and in farmland with scattered trees and bushes. Sea-level to 1,500 m, wintering to 2,000 m.

**FIELD CHARACTERS** Big robust buteo (largest in Nearctic), as adult usually showing much rufous and

flight, but for much stronger dark bands on trailing edges of wings and, usually, tail, while primary-windows absent above on adult and part of more extensive areas on juvenile. See also pale-morph juvenile of sympatric Swainson's Hawk [193]. Although largely allopatric except in Texas and Mexico, adult White-tailed Hawk [195] looks very white from below, with plain or rufous-banded underbody and wing-linings, but has greyish-banded flight-feathers with strong dusky trailing edges and broad black subterminal tail-band. Only other buteo with fully feathered legs is Rough-legged Buzzard [209], and pale morphs of all ages and dark-morph adult easily distinguished; dark-morph juvenile can be very like dark-morph juvenile Ferruginous, but has smaller bill, gape and head, and pale forehead as well as, in flight from below, more solid carpal patches (almost no white at bases of primary coverts) and broader black on wing-tips. Other dark-morph buteos also have more extensively dark wing-tips, as well as different tail pattern.

**VOICE** Generally silent, but thin whistle in courtship and, when disturbed at nest, loud *keerrr* or *knee-ah*, essentially long-drawn and disyllabic, or shorter harsher *kaah*; recalls Herring Gull *Larus argentatus*.

**FOOD** Mainly small to medium-sized mammals of open grasslands; some birds; also snakes and other reptiles, amphibians, and large insects (notably swarming locusts and grasshoppers). Mammals, which form well over 80% of prey, include rabbits and hares, prairie dogs *Cynomys* and other ground squirrels (especially *Spermophilus*), and western pocket gophers *Thomomys*. Birds range from adult and fledgling meadowlarks *Sturnella* and other passerines to such gamebirds as Sage Grouse *Centrocercus urophasianus* and Ring-necked Pheasant *Phasianus colchicus*. Commonly still-hunts from perch of low or moderate height, or hunts on wing – by low fast flight, by hovering or by higher soaring – swooping on to prey on ground; will also forage on foot. Attracted to recently burnt ground. Pairs reported to hunt co-operatively.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs; also family parties, though some juveniles disperse within c3 weeks of leaving nest. Up to about ten recorded soaring together over good hunting habitat, and communal roosts occasionally formed in winter, sometimes with other raptors; but not generally gregarious on migration. Single and mutual high-circling common.

**BREEDING** April–August. Large stick nest, sometimes becoming huge with repeated use, often c1 m across and 1–2 m deep, occasionally growing to 4–5 m high, with generous cup up to c30 cm deep, lined with leaves, bark, roots, dung and bones, on lone tree or large bush where available, but at times on cliff or smaller outcrop,

among rocks on steeply sloping ground, on utility power pole or even haystack or derelict building; now increasingly adapting to artificial platforms. Clutch 3–4 (1–8). Incubation 28–33 days. Fledging 38–40 days.

**POPULATION** Regional declines widely reported over past 40 years, and still 'thought to be declining in several areas, especially on the periphery of its range.... primarily the result of cultivation, grazing and fire degrading habitat throughout' (BirdLife International). Nevertheless, remains fairly common in suitable habitat; readily takes to artificial nest platforms. Limits of rather restricted summer range enclose only 2.4 million km<sup>2</sup>. Breeding population estimated at 2,800–3,600 pairs in 1979, 3,000–5,600 pairs in 1992, and 5,800–14,000 individuals in 1995. Even the highest of the estimated numbers of pairs gives a density of only 1 pair/430 km<sup>2</sup>, but species needs extensive open country and is highly sensitive to human disturbance, which readily results in desertion at egg stage. Numbers and breeding success also closely linked to fluctuations in populations of main prey mammals, some of which (especially prairie dogs and gophers; see Food) are themselves kept down by ranchers and farmers.

**GEOGRAPHICAL VARIATION** Monotypic, but dimorphic, almost polymorphic, with considerable variation; dark morphs generally rare to scarce, proportion varying locally but never more than c10% and usually much less.

**MEASUREMENTS** ♂ wing 421–440 mm, ♀ 427–450 mm; ♂ tail 231–246 mm, ♀ 239–252 mm; ♂♀ tarsus 81–92 mm. **Weights** 980 g–2.03 kg, mean 1.58 kg; ♂ mean 1.05 kg, ♀ 1.23 kg.

**REFERENCES** Angell (1969), Baughman (1947), Bechard & Schmutz (1995), Bechard *et al.* (1990), BirdLife International (2000), Blair & Schitoskey (1982), Bock & Lepthien (1977), Bohm (1977), Call (1979), Clark *et al.* (1989), Clark (1981), Clark & Wheeler (1987), de Smet & Contad (1991), Eckert (1982), Evans (1982), Fitner *et al.* (1977), Fyfe & Olendorf (1976), Gilmer & Stewart (1983), Gilmer *et al.* (1985), Harnata (1981), Herndon (1973, 1974), Houston & Bechard (1984), Howard & Hillard (1980), Howard & Wolfe (1976), Howell & Webb (1995), Jacot (1934), Johnsgard (1990), Kochert *et al.* (1988), Konrad & Gilmer (1986), Lokemoen & Duebber (1976), Moore (1987), Morisch (1985), Murphy (1978), Olendorf (1973, 1993), Palmer (1988), Powers (1981), Powers *et al.* (1975), Ramakka & Woyewodzie (1993), Restani (1989), Roth & Marzluff (1989), Salt (1939), Schmutz (1977, 1984, 1987), Schmutz & Fyfe (1987), Schmutz & Hungle (1989), Schmutz & Schmutz (1981), Smith & Murphy (1978), Smith *et al.* (1981), Snow (1974), Snyder & Wiley (1976), Stalmaster (1988), Steenhof (1984), Steenhof *et al.* (1993), Thurow & White (1983), Tomback & Murphy (1981), Wakeley (1978a/b), Weston (1969), Weston & Ellis (1968), Wheeler & Clark (1995), White & Thurow (1985), Wollinden (1973), Wollinden & Murphy (1977, 1983, 1989).

## 209 ROUGH-LEGGED BUZZARD

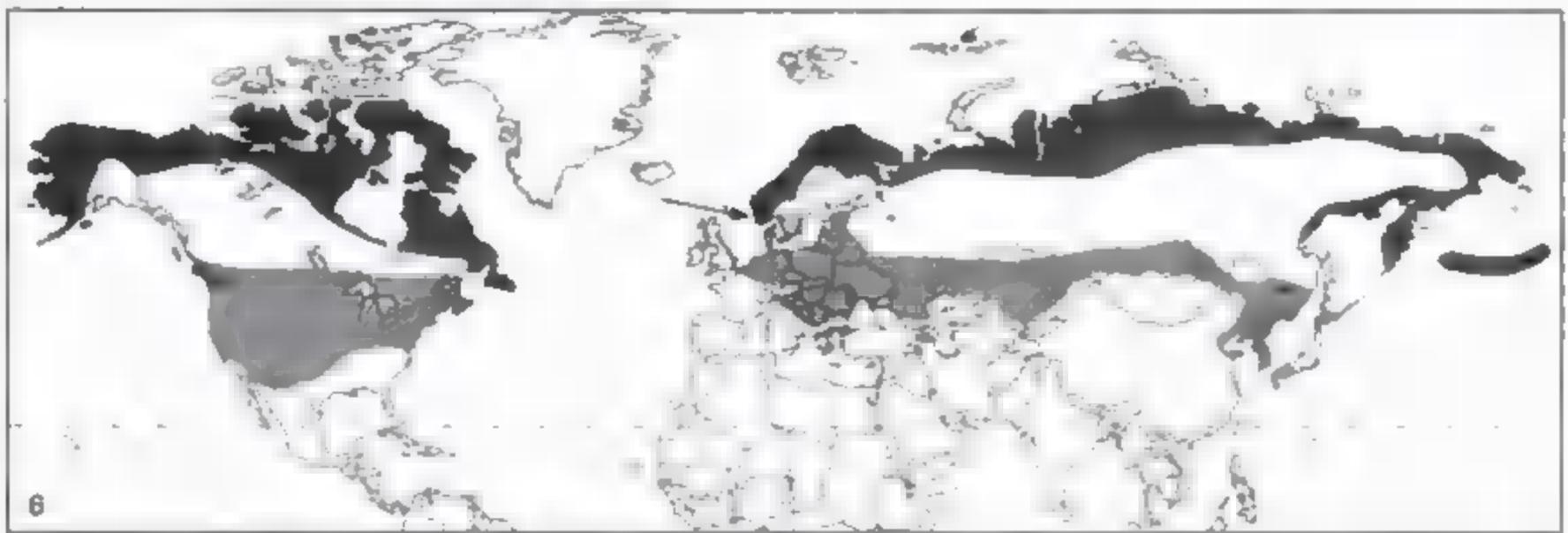
*Buteo lagopus* (Pontoppidan, 1763)

Plate 68

Other name: Rough-legged Hawk (North America)

**DISTRIBUTION** Circumpolar in Holarctic, southern limits at all times varying according to food supply (in North America c75°N to 52.5°N, in winter 53°N to 28°N

in west and 49°N to 37°N in east; in Eurasia c71°N to 58°N in west, otherwise 75°N to 65°N but in east south to 50°N, and in winter generally 60°N to 45°N but locally to 38/37°N; order 6; periodic fluctuations in numbers but generally not uncommon, and in years when small



mammals abundant often very numerous, and populations probably stable in long term. Breeds northwest USA, north Canada and across north Eurasia in arctic and subarctic zones, southward extension varying greatly from year to year in tandem with food supply: central and east Aleutians, and west and central Alaska across northern parts of Canada (in west south regularly to central Yukon and Great Bear Lake, in east to southern shores of Hudson Bay and central Quebec) east to central Newfoundland; and in Europe from southwest, central and north Fennoscandia (south to south Norway and central Finland) eastward, mostly within Arctic Circle, across north Siberian tundra (sometimes south into northernmost taiga) to Bering Sea, then down through Kamchatka to north Kurils, and extending variable distance south along shores of Sea of Okhotsk; in years of rodent abundance range can extend well into boreal zone, while greatly restricted when food supply poor.

**MOVEMENTS** Migratory. Timing of autumn departure and distance travelled largely dependent on rodent numbers and extent of snow cover in breeding area, and may start late August, but main exodus generally September–October (though some recorded in Arctic in November if conditions there remain good). In Eurasia, while not insignificant numbers cross south Baltic (600–1,480 annually at Falsterbo, 1,151 during 17–19 October 1978 at Bornholm), main route from Fennoscandia is through southeast Finland (e.g. 3,222 during 9–12 October 1982, 1,100 on 23–24 September 1992) and Karelian isthmus, but passage otherwise on comparatively broad front, with some tunnelling down through larger river valleys in taiga (steady passage along Yenisey generally late September–early November, evidently regular in south Kazakhstan in early November, e.g. 40 through Chokpak Pass in 1985), while in far east passage recorded along Chukchi Peninsula and down into northeast China, but numbers there usually very small. Some winter irregularly southern Sweden but, apart from small numbers west to Britain (rarely, Ireland), main wintering area of European breeders extends through central and eastern Europe south to Alps, Balkans and northern Caucasus, with fewer south to Turkey, and that of eastern populations across central Asia, where normal southern limits are northwest China, north Mongolia, Korea and north Japan (south Hokkaido), stragglers very occasionally reaching, for example, Middle East, central and southern China (Yunnan, Fujian, Guangdong), southern Ryukyus, and Taiwan; Siberian *menzbieri* or intergrades (see Geographical

Variation) occasionally reported west to central Europe; otherwise, periodic eruptive movements, precipitated by high numbers of juveniles coupled with abrupt crash in prey populations (and/or sudden onset of severe weather), result in far greater numbers reaching west Europe and many more in southern extremities of winter range. Liable to wander widely in winter quarters, again depending on food availability, prior to more leisurely return migration that starts early, from January in south (e.g. east Romania, maximum 80 at Dobrogea on 21 January 1988), but more earnestly from mid March, with peak numbers from mid April in south Finland (3,910 crossed Gulf of Bothnia during April 1984, with 1,200 on one day alone); in central Siberia up to 10 daily move up Yenisey during late April to end May; breeding areas reoccupied from late April, not until June in northernmost range, but, if food scarce on birds' arrival, wide-ranging nomadism then frequent, these 'searching migrations' at times taking individuals thousands of kilometres from previously established breeding area or natal site. Data for Nearctic less comprehensive: in Canada, southward movement in late October at Tadoussac in east Quebec, with annual mean 460, and relatively large numbers at Duluth (Hawk Ridge Nature Reserve) in east Minnesota, where average of 400+ each autumn (maximum 1,000+) and over 350 there in spring 2000 (BK Wheeler *in litt.*), while Whitefish Point on southeast shore of Lake Superior considered best USA watchpoint for this species (850 in spring); winters in broad band from southern Canada to middle latitudes of USA, in west few extending south just into northern Mexico, but in east, where largest numbers winter in upstate New York, normally not found south of Kentucky and Virginia. A very dark female found in Iceland in April 1980 was identified as *sanctijohannis* by measurements, while two records of dark-morph individuals in Britain and two others in southern Sweden, all in autumn, possibly also involved vagrants from Nearctic (but see Geographical Variation).

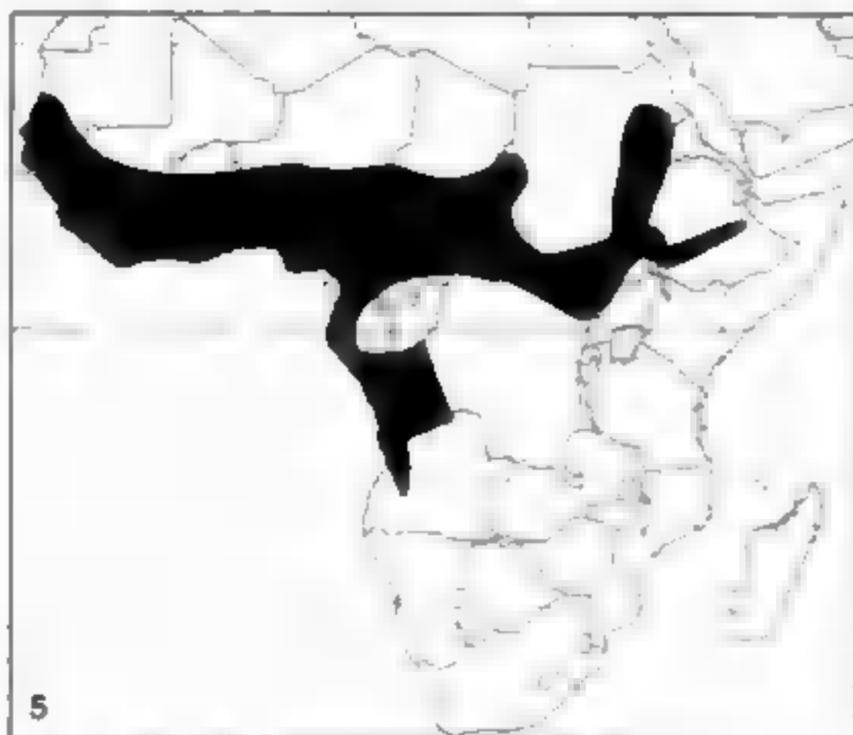
**HABITAT** Essentially open country with low rough vegetation and good all-round visibility. Breeds on lowland treeless tundra and, to lesser extent but regularly, at higher altitude along river valleys in Fennoscandian fjells and subalpine birch forest, small numbers extending into wooded tundra and, when lemmings and voles abundant, into thin northernmost taiga, then usually near forest edge in areas with rivers or lakes, bogs and large clearings. In winter, although using somewhat more varied habitats, including farmland and open

indistinct dusky subterminal band (but sometimes all barred); juvenile (which should have narrower wings and longer tail) blackish-brown above with barred primaries and browner tail evenly barred. Swainson's Hawk *Buteo swainsoni* [193]: slender with relatively long pointed wings; dark-morph adult dark brown above with pale U variably visible above base of fine-banded tail; juvenile (not shown) is, unlike juveniles of many buteos, very similar in proportions to adult (cf. fig. 45 on p. 665). White-tailed Hawk *B. albicaudatus* [195]: distinctively shaped with long and relatively pointed wings pinched in at base; dark morphs uncommon and not found in North and Central America; dark-morph adult all slate-grey to blackish but for whitish marks on rump, and white tail with fine dark wavy lines and bold black subterminal band; dark-morph juvenile (which should have narrower wings and longer tail) extensively black-brown but for grey tail with many fine dark bars and obscure subterminal band. Zone-tailed Hawk *B. albionotatus* [199]: large with slender wings and long-tail; dark in all plumages; adult all black above but for one wider and one (male) or two (female) narrower grey bands (these white below: see also fig. 47 on p. 676); juvenile browner-black above, with some white spotting on back/scapulars and browner tail with dark bands and broader subterminal band. Rufous-tailed Hawk *B. ventralis* [201]: compact, with broad rounded wings; dark-morph adult all sooty-black with slightly paler edges to coverts, and tail dusky-grey with many thin black bars and broader subterminal band; juvenile (not shown, but narrower-winged and longer-tailed) is blackish-brown above with paler edges and tail evenly dark-banded. Red-backed Hawk *B. polyosoma* [196]: long wings rather pointed; polymorphic and with various sex-linked differences, but adult tails always white with fine dark wavy lines and bold subterminal band, and juvenile tails always grey with many narrow blackish bars; dark morphs generally rare, but dark adult male dark grey to blackish-slate above, dark adult female blackish-grey above but for chestnut mantle and scapulars variably mixed with blackish-grey; dark juveniles (which again should have narrower wings and longer tail) all dull blackish-brown but for buff tips and white showing through on nape. Gurney's Hawk *B. porcellanous* [198]: slightly larger than Red-backed with broader and more round-tipped wings (see also fig. 46 on p. 674), and again polymorphic with similar plumages, but dark morphs much commoner. [For undersides, see plates 68, 66, 67, 66, 64, 64, 63, 62.]

**sanctijohannis** Apart from variably visible white forehead, all dark brown above with three or more whitish to grey bars on tail highlighting broader blackish subterminal and, in good view, hint of darker bars and trailing edges on flight-feathers; below, strong contrast between deep brown body and wing-coverts and silvery-grey remiges with dark bars and broader black trailing edges, usually with only faintly (if at all) barred whiter bases of outer primaries so that, in appropriate conditions, black colour of carpal patches may be more obvious, while undertail either fully barred as above or, less often, greyish with broad blackish subterminal (BK Wheeler); truly black (rather than dark brown) individuals occur less commonly, always with tail barred both above and below. **Pale-morph adult female** Above, similar to male, if browner, less grey, and with flight-feather bars less obvious, but tail either without bars inside dark subterminal band or with, occasionally, one or, exceptionally, two such bars; below, in addition to tail pattern, other typical differences shown by most females are paler streaky throat to upper breast against darker more solidly (sometimes more blotched) blackish-brown rear underbody, combined with paler less patterned wing-linings contrasting more prominent and larger black carpal patches, and less clearly barred flight-feathers, though still with black wing-tips and trailing edges. **Dark-morph adult female sanctijohannis** Much as typical dark male, and sometimes identical (but never black like some males); uppertail usually dark brown with broad blackish subterminal band, but sometimes also with faint grey or whitish inner bands (as male), and dark-ended undertail similarly with or, more usually, without inner barring (BK Wheeler); otherwise, bars on flight-feathers below generally less distinct than on male. Individuals with characters intermediate between light and dark morphs (e.g. paler-headed) also occur. **Pale-morph juvenile** Typically, lightly brown-streaked creamy head contrasts brown upperbody and wing-coverts on which broad pale edgings prominent, and paler panel on median coverts often conspicuous, while pale-tipped dark brown greater coverts and flight-feathers more uniform so that white (variable, sometimes greyer) patch

at base of primaries stands out clearly; dark-tipped uppertail-coverts white and base of tail white, latter merging into broad dusky brownish subterminal band; tail similar below, and rest of underside not unlike dilute version of typical adult female, thus less prominently streaked throat to breast, less patterned underwing and its coverts, with trailing wing-edges narrower and diffusely demarcated, remiges almost unbarred, so that solidly dark brown (not black) belly and blacker carpal patches and wing-tips usually striking. (Some juvenile males more strongly patterned below, but still readily aged by diffuse tail pattern.) **Dark-morph juvenile sanctijohannis** Resembles dark adult female unless slightly paler fringes and greyer wing-coverts visible above, but narrower and more diffuse dusky bars and trailing bands on undertail and underwings. Very few, however, have paler head or are otherwise intermediate between the two morphs: thus, may show greater contrast below between dark brown breast/belly and carpal patches and streaky lighter brown forebody and wing-linings. **Second-winter male** Very like adult but for, usually, up to four retained juvenile outermost primaries (shorter, more pointed and less black than new inners) and, often, some juvenile secondaries (so that black trailing edges broken) and upperwing-coverts (irregular pale median panel); plumage otherwise variable, from looking like typically paler-breasted and solidly dark-bellied adult female/juvenile (though generally more patterned linings and less prominent, more broken carpal patches) to resembling typical or even pale adult male, but almost always only one or two black tail-bars before subterminal band. **Second-winter female** Apart from some juvenile flight-feathers as on young male, differs from typical adult female in, usually, even more prominent solid dark carpal patches and no dark tail-bars (exceptionally, one) inside subterminal band. (See also fig. 48, and fig. 45 on p. 665.)

**CONFUSION SPECIES** In ideal situations, typical birds should be easily separated from other medium-sized raptors by tail and underwing patterns combined with underbody markings, and fully feathered legs, but in poorer view, or in case of less typical plumages, may need



during end September–early November and returns north again in May. Less clear pattern farther east, though small numbers appear annually in northeast Uganda during December–March. Populations south of the equator apparently more sedentary.

**HABITAT** Broadleaf woodland, plantations, open savannah, small farmlands and other cultivation with trees, forest edge. Breeds in more wooded southern parts of range before and during early rains, then moves north into more open country, returning south again before that becomes arid. Sea-level to 2,500 m.

**FIELD CHARACTERS** Mid-sized buteo, as adult rufous, blackish and brown with white abdomen, compact and of comparable size to migratory Steppe Buzzard [see under 203], though generally of slighter build with, on average, shorter wings and tail. Unobtrusive: except in nuptial flights or on migration, spends much of time perched, sometimes openly but often in cover; wing-tips short of tail-tip. Sexes similar, female averaging 7% larger and 31% heavier; juvenile distinct, probably moults direct into adult plumage, but not until very worn in second year.

**PERCHED Adult** Readily recognised by black-streaked rufous head to upper mantle (rufous clearest on cheeks and neck), almost solidly dark brown throat and chest (as well as back and wings), and white abdomen and thighs boldly marked with heart-shaped blotches; tail plain rufous apart from narrow blackish subterminal band. **Juvenile** Brown above, edged rufous, with rufous-tinged and thinly dark-banded tail; cream to pale buff below, with irregular dark blotches on chest and flanks. During first year may lose rufous edges above and become whiter below before moulting. **Bare parts** Eyes brown. Cere and feet yellow.

**FLIGHT** Mid-sized raptor, neatly shaped with rounded head, broad rounded wings, and medium-length tail often spread. Fast stiff beats; glides like many other smaller buteos, on flat wings with carpals forward and back-swept tips looking pointed; scars with clear dihedral. **Adult** Rufous tail sometimes obvious even at great height, particularly with sun shining through; otherwise all dark above (rufous head needs light to catch it), but flight-feathers clearly greyer and black-tipped; predominantly white below, with dark head and chest, black-blotched abdomen and wing-linings, grey carpal arcs, black-edged

flight-feathers, and rufous tail. **Juvenile** Similar pattern above, but secondaries less obviously greyish without clear black tips, and barred tail much less rufous; below, largely white to cream, without adult's dark head or black trailing wing-edges; body with irregular blotches, wing-linings almost plain, still with carpal arcs and dark wing-tips, but secondaries and tail finely barred greyish.

**CONFUSION SPECIES** Hardly likely to be confused with pale but dark-headed snake-eagles [67–69] (much larger and longer-winged, with protruding head and squared tail) and even juvenile easily distinguished from pale Western Honey-buzzard [18] or Booted Eagle [290]. But range overlaps with four other buzzards: Long-legged [206] in sub-Saharan strip from Senegal to Ethiopia; Augur [212] in northeast Africa and Angola; Steppe [see under 203] almost anywhere (though mainly during September–April); and Mountain Buzzard [204] more locally in Ethiopia. All except the last have red tail as adults, but Augur much larger, shorter-tailed, and in all plumages more or less plain white, black, rufous or rich buff below. Long-legged also larger and longer-winged, and both it and Steppe lack combination of adult's dark head and dark-blotched white underparts. Care particularly needed between juveniles of Red-necked and Mountain and some paler plumages of Steppe.

**VOICE** Silent except in circling and other displays. Loud ringing mew, *peeh-ah*, described as shriller than Common Buzzard [203]. Stuttering *pe-pe-pe-peeh* also noted.

**FOOD** Reptiles (chameleons and other lizards, small snakes) and amphibians probably most important; also some small mammals and birds, odd crabs and many insects (especially alate termites, grasshoppers, mantids) and other small arthropods. Still-hunts from tree perch or pole in open woodland, savannah or cultivation, catching all prey on ground or, in few cases, low vegetation. At times attends bush fires, where it also takes insects in air.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs, except during pre-breeding southward migration in September–November, when sometimes small parties, occasionally larger flocks. Commonest aerial display involves mutual circling, often with legs dangling, and much mewling (see Voice). At other times male undulates with short dives and upward swoops. Also weaving from side to side, described as 'rocking acrobatics' (Holman).

**BREEDING** Little known but, from apparent laying dates, likely January–April over much of range from West Africa to south Sudan, but also October onwards in western DR Congo and west Angola. Initially small structure of sticks, but up to 1 m across after re-use over several years, lined with green leaves; at 10–25 m in *Borassia* or other palms or woodland, but at up to 30 m or more in forest, or rarely on cliff ledge, and now commonly on pylons (Ghana). Clutch 2–3. Incubation and fledging periods uncertain: combined estimate of c.50–60 days (Brown *et al.*) surely too short.

**POPULATION** Generally regarded as common and, in view of wide lateral distribution across more than 5,000 km, five-figure population seems reasonable assessment, but the species is little studied and there

are no data on densities. Doubtless at risk in some areas from habitat destruction, but seasonally mobile, and readily adapts to plantations and to cultivated areas with some trees. Indeed, may well actually benefit from continuing deforestation in West Africa.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 325–361 mm, ♀ 339–395 mm;

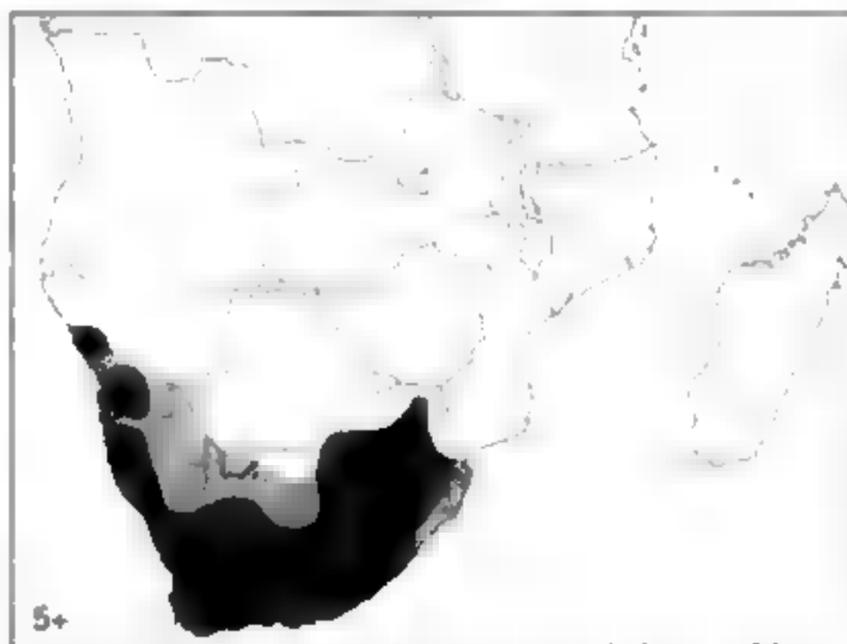
♂♀ tail 178–205 mm, tarsus 77–82 mm. **Weights** ♂ 525–620 g, ♀ 580–890 g.

**REFERENCES** Britton (1980), Brown *et al.* (1982), Chapin (1982), Grimes (1987), Holman (1947), Kemp & Kemp (1998), Lippens & Wille (1976), Louette (1981, 1991), Mackworth-Praed & Grant (1957–73), Pinto (1983), Serle (1950), Serle *et al.* (1977), Snow (1978), Thiollay (1975a/b, 1976a/b, 1977a/b, 1978c, 1985d), Young (1946), Zimmermann *et al.* (1996).

## 211 JACKAL BUZZARD *Buteo rufofuscus* (JR Forster, 1798)

Plate 71

**DISTRIBUTION** Afrotropical (22°S to 35°S); order 5+; common, possibly increasing range to northeast. Endemic to southern Africa: much of South Africa (except central-north), extending in west up to central Namibia and in east through Lesotho and Swaziland (as well as almost all of former Transvaal) into south Mozambique and, farther west, extreme southeast Botswana. In west Namibia clearly overlaps Augur Buzzard [212], with which used to be thought conspecific, and may do also in Zimbabwe (see Movements).



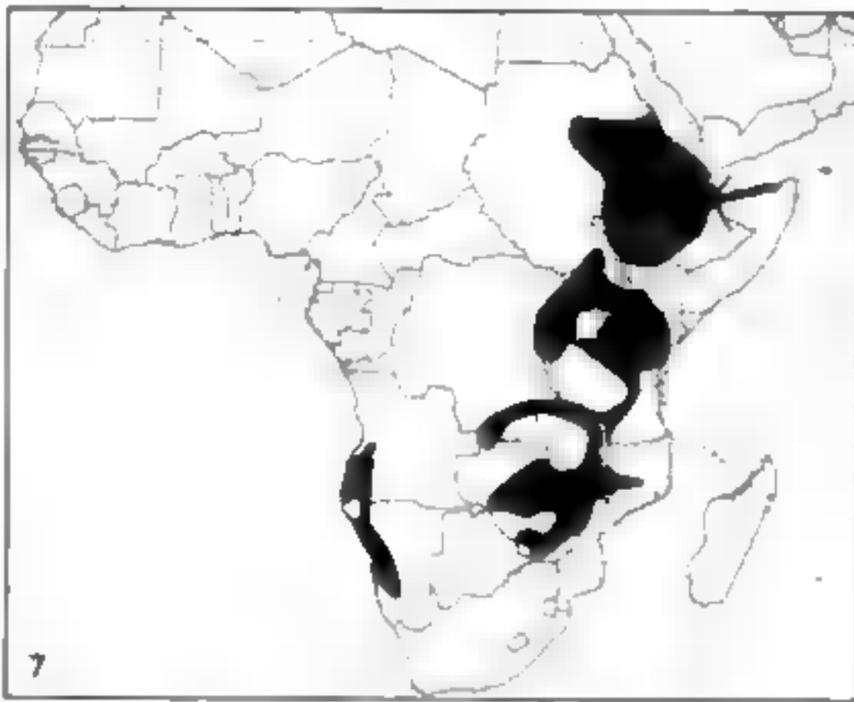
**MOVEMENTS** Many established pairs probably completely sedentary, but considerable fluctuations in numbers of adults in particular areas (e.g. Katoo) indicate that some do travel about. One adult female was recaptured nine years later only 8 km from where ringed; yet other adult recoveries have involved movements of 300–400 km. Immatures are more widely dispersive: a first-year female was found 236 km away after 18 months; a juvenile 640 km away after seven months. Species has been recorded at least twice in Zimbabwe, again in overlap with Augur Buzzard [212].

**HABITAT** Mainly hills, mountains and other broken country, in both arid and high-rainfall areas, varying from isolated rocky outcrops to the highest ranges of Lesotho. Hunts particularly in mountain grassland, but also in, for example, subdesert coastal scrub in Namibia. Sea-level to 3,500 m, mostly above 1,000 m.

**FIELD CHARACTERS** Large, thickset buteo, as adult usually mostly blackish and rufous with paler wing-patch but very variable; has proportionately smaller and more pointed head, and stronger bill, than most buzzards. Perches conspicuously on roadside poles, fence posts,

pylons, trees, rocky outcrops; long wings extend beyond tip of short tail. Somewhat polymorphic. Sexes similar, female averaging 8% larger and 38% heavier; juvenile distinct; moults completely from six months to end of second year, but not fully adult until second half of third. **PERCHED Adult** Blackish-slate above, and on head and throat, apart from plain rich rufous rump and tail, pale area on folded secondaries, and variable white or rufous-buff edgings on back; below, usually ragged white line beneath dark throat, then broad rufous chest-band, black abdomen with white bars, and rufous crissum. **Variations** Tendency towards polymorphism: a few individuals show extensive white edgings on back; some are all brown below (except for rufous undertail), or largely brown, black or white, or combination of two of these colours; others variably whitish on chest, some predominantly so. **Juvenile** Shades of brown above, edged rufous and buff, with paler head, indistinct lighter area on folded secondaries, and thinly and obscurely dark-banded tail; but browns become paler by fading and edges wear off; similarly, all rufous-buff below at fledging, with variable fine dark shaft-streaks, but ground colour often lightens to buff or whitish through abrasion and fading. **Immature** Apparently moults into immature stage from six months on; blackish-slate upperparts (much as adult), pale rufous underparts (much as juvenile) and rich rufous tail, usually (but not always) with dark subterminal band or spots; tail markings often retained into otherwise adult plumage after third year. **Bare parts** Adult eyes dark reddish-brown, juvenile dark brown. Adult cere yellow, juvenile duller. Legs yellow.

**FLIGHT** Mid-sized to largish raptor with prominent head, bulging secondaries on long broad wings, very short tail (clearly longer on juvenile); wingspan 2.7 times total length. Loose flexible beats interspersed with glides on raised wings and sometimes slightly rocking; soars with dihedral less marked; regularly hangs on updraughts with flat or nearly flat wings, or hovers. **Typical adult** Mainly black above but for red tail, long broad panel of dark-banded whitish (looking grey) on secondaries and inner primaries, and variable whitish edgings on back and scapulars; even more distinctive below, with black head, rufous chest and tail, barred abdomen, wing-linings almost always blackish (greater coverts paler than rest) and flight-feathers nearly plain white (slight barring on secondaries) with black tips forming broad trailing edges. Occasional polymorphic variations (see above) apparently also have this underwing pattern, except that wing-linings sometimes 30–50% white. **Juvenile** Much less distinctive above, though still showing paler



pylons, and on trees, rocks and cliffs; long wings exceed tip of short tail. Dimorphic; also rather different form in Somalia (see Geographical Variation). Sexes similar, female averaging 10% larger and up to 18% heavier; juvenile distinct; moults completely between late in first year and end of second, but may not be fully adult until some time in third. **Pale-morph adult male** All blackish-slate above, apart from obvious dark-barréd whitish patch on folded secondaries, some variable whitish edges on back and scapulars, and rich rufous rump and tail; and generally all white below. **Pale-morph adult female** Apart from greater size, differs only in having black or streaky black throat. **Dark-morph adult** (eastern Africa) All black below from throat to crissum, but still dark-barréd whitish patch on secondaries and rufous rump and tail like pale morph; this morph almost unknown in southern Africa, but rare intermediates with black blotching on abdomen (and wing-linings) occur there. **Somali adult (archeri)** Typically, white of pale morph is replaced by rufous, so some rufous edgings on back and scapulars, and all rufous below but for variable black streaking on throat and chest-sides; but some intermediates in northeast of species range are white with variable amounts of rufous, especially on thighs and crissum. **Pale-morph juvenile** Brown above, edged buff, with indistinct paler barréd area on folded secondaries, and finely barréd tail; all buff below but for streaking on throat and chest-sides. **Second-year** Colour of underbody is at first only obvious distinguishing feature between juvenile and second year at any distance, this taking about 180 days to moult from buff through mixed creamy-buff to white; in Zimbabwe, direct moults of 427–441 days from juvenile to adult were recorded between August (when approaching one year old) and November 14–15 months later (Lendrum); by this time, blackish above, and rufous tail has dark subterminal band which is sometimes retained into adult plumages well after second year. **Dark-morph juvenile** Similar to pale-morph juvenile above, if slightly darker, and uniformly brownish-black below; finely barréd secondaries and tail. **Somali juvenile (archeri)** Similar to pale-morph juvenile above, but underbody almost plain pale tawny. **Bare parts** Adult eyes dark reddish-brown, juvenile dark brown. Cere and legs yellow.

**FLIGHT** Mid-sized raptor with large head, bulging secondaries on long broad wings, and conspicuously short tail (clearly longer on juvenile; see also fig. 42 on p. 646);

wingspan 2.6 times total length. Loose flexible beats interspersed with glides on raised wings and sometimes slightly rocking; soars with dihedral less marked; regularly hangs on updraughts with flat or nearly flat wings, or hovers. **Pale-morph adult** Above, mainly black but for rufous rump and tail, and long broad panel of dark-barréd whitish (looking grey) across secondaries and inner primaries; below, except for rufous tail (paler than upperside), largely white more or less outlined in black (black wing-tips, trailing edges, carpal arcs, thinly barréd secondaries, and varying amount of black streaking or solid black showing at sides of head or, in female, usually right across throat). **Dark-morph adult** (eastern Africa) Similar above; all black below from throat to crissum, including wing-linings (though greater coverts often form paler and greyer midwing band); otherwise, as pale morph, though wing-tips, trailing edges and even barring on undersides of secondaries often seem bolder below and underside of tail can look darker rufous. (Rare intermediates in southern Africa blotched on underbody and wing-linings; see 'Perched'.) **Somali adult (archeri)** Similar above but for some rufous edgings on back and scapulars; below, white or black of chest to crissum and wing-linings most typically replaced by rich dark rufous, throat variably mixed with white, buff and black streaking, and inner secondaries also washed pale rufous to rich buff; beware also of intermediates in northeast of species range (see 'Perched'). **Pale-morph juvenile** Above, brown with buff edgings, and paler flight-feathers and tail closely dark-barréd; below, body and wing-linings buff, showing up dark streaking on throat and chest sides, blackish wing-tips and extensive carpal arcs; white bases to primaries and, to lesser extent, secondaries also stand out from finely barréd trailing wing-edges (no black band) and tail. **Pale-morph second-year** See 'Perched'; colour of wing-linings matches underbody; moulted rufous tail has dark subterminal band which is sometimes retained into otherwise adult plumage. **Dark-morph juvenile** Upperparts, flight-feathers and tail broadly similar to pale-morph juvenile, but underbody and wing-linings all brownish-black. **Somali juvenile (archeri)** Upperparts, flight-feathers and tail again similar, but underbody and wing-linings almost plain pale tawny with some rufous streaks.

**CONFUSION SPECIES** Adult distinctive perched or in flight, whether white, black or (*archeri*) rufous below. In southern Africa, Jackal Buzzard [211] has similar size and shape; see that species for possibilities of confusion, particularly among melanistic morphs and juveniles. Short rufous tail, broad wings and rocking flight with marked dihedral might suggest Bateleur [73], but that has very different shape, and contrast between black body and white wing-linings. Melanistic individuals distinguished from dark-morph Long-legged Buzzard [206], whether adult or juvenile, by shape and tail colour/pattern. Limited sympatry with generally smaller Red-necked Buzzard [210], but some overlap in size and, though dark head and chest and blotched abdomen make adult distinctive, juvenile rather similar apart from blotched flanks, more rufous edges above, and less bulging secondaries.

**VOICE** Often noisy, sometimes even outside breeding season, much more so than Jackal Buzzard [211] and voice quite different. Common call, used in various

contexts from contact to alarm, is harsh ringing crow, *a-kaw a-kaw a-kaw* or *a-ung a-ung a-ung*. In aerial displays this is drawn out into longer, higher-pitched *a-waaa a-waaa...* At all times, male sounds higher than female. Unlike most buzzards, including Jackal, no mewling calls produced, but Somali form (*archeri*) said to have 'penetrating mewling nasal bleat'.

**FOOD** Small mammals, reptiles, birds, insects, some frogs; occasionally carrion. In upland eastern Africa, mainly rodents (especially field rats and mole-rats) and other small mammals, often insects, some birds, frogs and reptiles, also roadkills; in Zimbabwe, mainly reptiles (both lizards and snakes), some mammals, few birds. Among mammals are occasional squirrels, and young of hare and hyrax; reptiles include water monitors and venomous snakes; birds mainly small ground-feeders, but occasionally as big as francolins *Francolinus* and chickens, also some nestlings. Virtually all prey caught on ground, either by still-hunting from perch (often roadside pole, sometimes low mound) or swooping down from soaring flight or hover. Mole-rat activity probably located in flight: buzzard lands nearby and, when mole-rat moves again, seizes it through earth with short pounce. May forage for insects on ground, and will sometimes hop after vertebrate prey.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Some polygamy recorded. Spectacular aerial displays particularly involve pair soaring together: male parachutes down on raised wings, legs dangling, towards circling female, who lowers her legs, rolls over, and they touch feet, repeating this over and over with much calling; sometimes they spiral down with interlocked feet. Pair may also dive together, or male may stoop so close to perched female that she has to crouch, or either may dive and swoop over nest site. More rarely, pair-members fly towards each other at great speed, sheering off at last moment.

**BREEDING** July–January in Zimbabwe and Zambia, and almost any month in East Africa (especially June–December or, at highest altitudes, January–June); in north Somalia, isolated *archeri* (see Geographical Variation) end March–June. Nest is large bulky structure of sticks, 45 cm–1 m across and 15–30 cm deep, lined with green leaves; usually at 7–15+ m in tree, except at highest

altitudes and in southern Africa where generally on cliff ledge, often at base of small tree or bush; *archeri* frequently in euphorbia. Clutch 2–3 (1–3), but *archeri* 1–2. Incubation 39–40 days. Fledging 48–59 days.

**POPULATION** In Zimbabwe density about 1 pair/17 km<sup>2</sup>, with actual territories averaging 2–6 km<sup>2</sup>, but from Kenya northwards sometimes probably as high as 1 pair/km<sup>2</sup>. On this basis, total population likely to be into seven figures. Not threatened, and adapts readily to cultivation, eucalyptus plantations, and extensive human habitation; but *archeri* in Somalia has limited range and may be vulnerable to habitat degradation.

**GEOGRAPHICAL VARIATION** Two races recognised (three when Jackal Buzzard [211] thought conspecific), but monotypic over most of range and position of remaining isolated population unclear.

*B. a. augur* (whole range except north Somalia) Some white mottling above and largely white below; or melanistic morph all black.

*B. a. archeri* (north Somalia) Averages marginally smaller; upperparts mottled rufous, and almost entirely rufous below but for white and black around throat; no melanistic morph.

In some respects *archeri* appears related to Jackal Buzzard, and perhaps should be treated as third species in this group. Proportion of melanistic morph of nominate *augur* very variable; unknown (or possibly confused with melanistic Jackal Buzzards?) south of Zambezi except for rare partially black individuals; but averaging c 10% in Kenya (up to 25% in high-rainfall areas) and as high as 50–55% in population inhabiting damp cold forest of southeast Ethiopia.

**MEASUREMENTS** *B. a. augur* ♂ wing 384–415 mm, ♀ 435–446 mm; ♂♀ tail 197–230 mm, tarsus 80–92 mm. *B. a. archeri* ♂♀ wing 379–436 mm. **Weights** *B. a. augur* ♂ 880 g–1.16 kg (five), ♀ 1.1–1.3 kg (seven).

**REFERENCES** Archer & Godman (1937), Ash & Miskell (1983), Bataamba (1989), Benson & Benson (1975), Britton (1980), Brooke (1975), Brown *et al.* (1982), Kemp & Kemp (1998), Lendrum (1979), Lendrum & Lendrum (1982), Lewis & Pomeroy (1989), Louette (1991), Maclean (1993), Pickford *et al.* (1989), Pinto (1983), Snow (1978), van Someren (1956), Steyn (1963, 1982), Weaving (1972), Zimmerman *et al.* (1996).

## Accipitridae (q: harpy eagles)

### 213 CRESTED EAGLE

*Morphnus guianensis* (Daudin, 1800)

Plate 72

Other name: Guiana Crested Eagle

**DISTRIBUTION** Neotropical (18°N to 27°S); order 4±; wide distribution, but uncommon at best, more usually rare to very rare and local, with generally low densities. Central and northern South America: north Guatemala and Belize (possibly even extreme southeast Mexico, in Campeche or Chiapas?), through north Honduras, Nicaragua, Costa Rica and Panama, thence north and

east of Andes in Colombia (but on Pacific side south only to Serranía de Baudó), northwest Venezuela (Zulia, Aragua) and Guianas through Brazil (south still, perhaps, to Santa Catarina) into east Ecuador, northeast and southeast Peru (especially Manú area), east Bolivia (Santa Cruz), Paraguay and, probably formerly, extreme northeast Argentina (one to three old reports last 1980).

**MOVEMENTS** Generally sedentary.



**HABITAT** Humid lowland tropical and subtropical forest; also gallery strips and forest ravines. Usually in primary forest, but now 'also in adjacent tall second growth and semi-open'. Mainly sea-level to 600 m, but locally to 1,000 m, even 1,500 m.

**FIELD CHARACTERS** Large slender eagle, variable in plumage, with large head (effect of size increased by erectile feathers of nape and of wide single-pointed occipital crest), rather short rounded wings, long tail, bare legs and strong bill (though last two relatively slender/small for member of harpy group). Perches almost exclusively high in canopy of tall trees, but often choosing conspicuous bare branch, where sits still for long periods apart from occasional turns or jerks of head; wing-tips leave most of tail exposed. Often stated to be polymorphic, but perhaps more helpfully treated as dimorphic: colour saturation does vary on head and chest of pale morph and over whole body of relatively rare dark morph, but most so-called intermediates between the two likely to be third-year immatures. Sexes similar, with some overlap in size, though female up to 14% larger and, in particular, clearly longer-tailed by up to 19%; juvenile distinct; as adult after about three years.

**PERCHED** **Pale-morph adult** Head and upper chest light brownish-grey, apart from whiter throat and black sandy-tipped crest and small mask; back and wings blackish-brown, more or less narrowly tipped or fringed whitish on wings and tail-coverts; tail black with three mottled grey bands and narrow whitish tip; lower chest and abdomen white or cream, sparsely barred with cinnamon to rufous, most obviously on thighs. **Dark-morph adult ('taeniatus')** Head and chest dark grey, or chest blackish, with blacker and more uniform upperparts, and white abdomen closely barred black; tail as pale morph. **Extreme dark-morph adult** Almost all blackish with, at most, scattered thin pale tips on wing-coverts and abdomen (no more than suggesting thin pale barring), apart from grey-banded tail and, hidden at rest, barred flight-feathers. **Pale-morph juvenile** White to whitish head but for dark mask and dusky-tipped crest-feathers; upperparts sandy-grey with rather obscure blackish markings and white edges; tail much less boldly

marked than adult's, appearing marbled grey with seven to eight blackish bars; underbody white to creamy-buff. **Dark-morph juvenile** Apparently very similar, differing only in strong blackish mottling on back and wing-coverts and pale grey marbling on underbody. **Pale-morph second-year** Still much as juvenile, but crest tipped and spotted with dark brown, head and chest more sandy-buff, and mantle darker and more strongly blackish-mottled, giving much greater contrast to pale-mottled wings; tail intermediate, either predominantly grey-brown with five to seven narrow dark bars or blackish with three to four grey-brown bands. **Dark-morph second-year** Head and chest darker sandy-grey, chest also more or less spotted with dark brown, wing-coverts less contrastingly pale, and abdomen mottled or sparsely barred with dark brown. **Pale-morph third-year** Now much as pale-morph adult, but head and chest paler, blackish wing-coverts more clearly fringed and mottled pale grey and sandy (forming pale, freckled panel on closed wing), abdomen white with little or no barring, tail with three to four greyish bands. **Dark-morph third-year** As dark-morph adult, but head and chest paler with light tips, wing-coverts also paler-fringed and more mottled, abdomen much whiter with few black bars and spots; tail as pale-morph third-year. **Bare parts** Adult eyes variously described as brown, grey or greenish-yellow (but sequence of changes at different ages not clear), juvenile brown. Adult cere and bare lores slaty-black, juvenile greyer. Legs yellow.

**FLIGHT** Big slender eagle with large and strongly protruding head, evenly broad and relatively short rounded wings, and long round-tipped tail; wingspan only 1.7 times total length, tail projection roughly equal to wing-base. No descriptions of flight action or of wing positions in gliding and soaring; variously said to soar rarely or frequently. **Pale-morph adult** Apart from pale greyish head and black crest and mask, looks all blackish above but for three mottled grey tail-bands while, at closer ranges, inconspicuous bars on flight-feathers and thin pale tips to wing-coverts, rump and tail may also show; below, body and wing-linings all creamy-white but for grey chest and sparsely cinnamon-banded abdomen, while quills greyish with three black bands on tail and black bars on flight-feathers, boldest on primaries. **Dark-morph adult** Banded tail and barred flight-feathers as on pale morph; otherwise, more uniformly blackish above, with dark grey head, and, below, boldly blackish chest (contrasting pale throat) and black bars on abdomen and wing-linings; in extreme cases, almost solidly blackish but for tail and flight-feathers. **Juveniles** From above, white head with dusky crest and mask stands out from greyish back and wing-coverts, blackish-banded flight-feathers, and grey-brown tail with many narrow dusky bars; from below, looks all creamy-white with dusky barring on white-tipped flight-feathers and tail; rare dark morph likely to be distinguishable only in exceptional conditions when extent of black mottling on back and wing-coverts, or presence of grey marbling on underbody and wing-linings, can be established. **Second- and third-years** For differences from juveniles and adults respectively, and distinctions between pale and dark morphs, see 'Perched'; in each case, wing-linings are plain, barred, mottled or spotted as abdomen, while undersides of tail and flight-feathers correspond to those of juveniles or adults.

**CONFUSION SPECIES** At all ages, most likely to be confused with Harpy Eagle [214], which has similar habitat requirements and comparable habits, but is larger and more thickset, with broader, rounder wings, shorter and squarer-tipped tail, heavier bill, forked crest, and more massive if relatively shorter legs and feet; adult has much more contrastingly black chest-band and bold irregular bands on wing-linings; latter also indicated on juvenile, which also has broader tail-bars than juvenile Crested. Adult Crested otherwise unmistakable (though consider far smaller Grey-headed Kite [14] and Black-and-white Hawk Eagle [234]), but juvenile and at least earlier immature stages might be confused with two other eagles (which, however, both have fully feathered legs): juvenile Isidor's Eagle [247] – usually at higher altitudes – has shorter tail, and longer and less obviously broad rounded wings, while juvenile Ornate Hawk Eagle [245] is much smaller, browner above, with barred flanks.

**VOICE** 'Shrill, high-pitched whistles, sometimes two-parted with second part higher in pitch' (Stiles & Skutch). Resembles Great Black Hawk [178] (Lehmann).

**FOOD** Small to medium-sized mammals, especially arboreal species, and reptiles; also tree-frogs, some birds. Small monkeys (e.g. woolly monkeys *Lagothrix*), kinkajous *Potos flavus*, opossums and other marsupials, and arboreal rodents perhaps make up bulk of food, though both arboreal and terrestrial snakes and lizards evidently taken regularly. Possibly still-hunts, as noted for sitting motionless in high trees for long periods, but one seen gliding very slowly with tail and wings widely fanned, about 50 m above canopy, may have been foraging. Watches for guans (Crauidae) and trumpeters (Psopidae) under fruit trees; also recorded attacking Cocks-of-the-rock *Rupicola rupicola* at lek.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. No descriptions of aerial displays: often said to soar 'rarely' or 'infrequently', but this is contradicted by others and at only nest studied often seen circling over forest (Bierregaard).

**BREEDING** Few data, but evidently March or April

onwards in low tropics (10°N to 10°S). Huge stick nest with shallow cup, decorated with greenery around edge, in main fork high in canopy of tall forest tree. Clutch 2 (1–2). Incubation and fledging periods not recorded.

**POPULATION** Low densities make this species rare, but its distributional limits enclose nearly 12 million km<sup>2</sup>, so that a mere 1 pair/2,000 km<sup>2</sup> might give a five-figure total without even considering immatures. Even that density, however, is probably seldom reached and the actual population may well not exceed the lower thousands. Formerly more widespread, and certainly commoner, in now largely deforested areas of Central and northern South America from Honduras through to at least northwest Colombia, as well as in many parts of Brazil – south to Mato Grosso and, in 19th century, even to Rio Grande do Sul – where now rare or extinct through the serious disturbance, soil erosion and forest destruction resulting from logging and from the mining of coal and various ores. These are increasing threats, while the birds' large size also makes them attractive targets for hunters, especially as they are usually quite approachable when perched. On the other hand, relatively recent breeding records in north Guatemala and Belize may represent slight extension of extreme northwestern range.

**GEOGRAPHICAL VARIATION** Monotypic, but dimorphic. Dark morph was long regarded as distinct subspecies, '*tarniatus*'.

**MEASUREMENTS** ♂ wing 425–449 mm, ♀ 425–484 mm; ♂ tail 360–385 mm, ♀ 390–430 mm; ♂♀ tarsus 103–118 mm. **Weights** ♂ 1.75 kg (one); c.5 kg.

**REFERENCES** Belton (1984), Bertoni (1913), Bierregaard (1985, 1994a), Bierregaard *et al.* (1995), BirdLife International (2000), Blake (1977), Chebez (1994), Collar & Andrew (1988), de la Peña (1992), Ellis & Whaley (1981), Friedmann (1950), Galetti *et al.* (1997), Haverschmidt (1968), Hill & Brown (1986), Howell & Webb (1995), Kill *et al.* (1989), Lehmann (1943), Meyburg (1986), Meyer de Schauensee & Phelps (1978), Miller & Miller (1992), Olrog (1985), Parker *et al.* (1982, 1996), Phelps & Phelps (1958), Ridgely & Gwynne (1989), Sick (1993), Stiles & Skutch (1989), Thiollay (1984, 1989b), Tostain *et al.* (1992).

## 214 HARPY EAGLE

*Harpia harpyja* (Linnaeus, 1758)

Plate 72

Other name: American Harpy Eagle

**DISTRIBUTION** Neotropical (19°N to 27°S); order 5; wide distribution, and still 'reasonably common in Amazonia', but elsewhere generally rare to very rare and local, with low densities. Central and northern South America: southeast Mexico (now limited to discrete areas of southeastern Vera Cruz, east Oaxaca and east Chiapas), very patchily through north Guatemala, south Belize, north Honduras, Nicaragua, Costa Rica and Panama (all but extinct in most Central American countries); thence north and east of Andes in Colombia (on Pacific side no farther south than Rio Saldaña and, perhaps, Serranía de Baudó, both in north Choco), and in north and east Venezuela and Guianas, southwards through Brazil (right down to Rio Grande do Sul until at least 1940s, but now endangered even in Paraná), as

well as in east Ecuador, east Peru, Bolivia (Pando, La Paz, Cochabamba, Santa Cruz), Paraguay and extreme northeast Argentina (Misiones).

**MOVEMENTS** Usually sedentary, but has wandered outside breeding areas to coasts of northern South America. Until 1950s sometimes reported in northwest Argentina (Jujuy, Salta, Formosa, Chaco, Tucumán), but the juvenile specimen from Tucumán is, in fact, a Crowned Solitary-eagle [184] and the dominant habitats in the other provinces listed suggest that those observations are also more likely to have involved that species (M Pearman).

**HABITAT** Tall wet tropical and subtropical forest in both lowlands and foothills, although usually in continuous high canopy, has adapted to broken forest in some areas.

Rawalpindi) and southeast Bangladesh (Chittagong?) – into Burma (west and east) and southeast China (Yunnan, also separately in Fujian) and Taiwan; thence south through Thailand, all countries of Indochina, and peninsular Malaysia, to Sumatra (with Bangka and possibly other satellite islands), Java, Bali, Borneo, Sulawesi (with Peleng), and Moluccas (Halmahera, Ternate, Buru, Seram, possibly Sula).



**MOVEMENTS** Generally considered sedentary, but isolated records around Bombay, and in Gujarat and Pakistan (where has nested), indicate some wandering in and from western India, and rarely descends to lower altitudes in winter in Nepal; also recorded outside normal range in Burma, while some uncertainty about status in extreme southeast China.

**HABITAT** Evergreen and, more locally, moist deciduous forest, sometimes secondary growth or scrub country, in foothills and mountains, perhaps most typically around forested ravines. Chiefly 300 m to 2,000 m, and in Himalayas to 2,700 m, but here and there down to sea-level or up to over 3,000 m (reported to 4,000 m in Nepal).

**FIELD CHARACTERS** Medium-sized to largish kite-like eagle, as adult predominantly black, with small bill (but large cere), slight nuchal crest, long wings, longish rounded tail, feathered legs, small and relatively weak feet, unusually short outer and long inner toes, only slightly curved claws. Perches unobtrusively, mainly within forest; sometimes clammers along and down branches when foraging (see Food); wing-tips exceed tail-tip. Sexes similar, but different populations very variable in size (see Geographical Variation) and females in any one region average 3–9% larger (and perhaps 50% heavier); juvenile and immature distinct; as adult after second year.

**PERCHED Adult** All black to blackish-brown but for variable whitish on lores and around eyes, as well as on uppertail-coverts, some faint greyish barring on tail and, in worn plumage, slightly browner scapulars and innermost secondaries. **Juvenile** Crown, nape, back and wings mostly dark brown (though not so dark as adult), with some yellow-buff speckling at first (lost with wear), buff-barréd rump and, again, obscurely grey-barréd tail, but forehead, sides of head and neck and whole underbody all tawny-buff more or less streaked with blackish; yellowest on head and breast with almost plain face and

throat, tinged more rusty and most heavily streaked on belly and thighs, more barréd on crissum. **Second-year** Often stated to moult to adult in one year, but intermediate stage in which whole underparts become dark brown with darker streaks, while head remains pale, appears to be distinct immature plumage. **Bare parts** Eyes dark brown. Cere and feet yellow.

**FLIGHT** Largish raptor, often appearing bigger in flight, with narrow projecting head, unusually long primaries on long, broad and somewhat paddle-shaped wings (broadest behind carpals and narrowing gradually inwards, particularly at bases of trailing edges), and longish narrow tail; wingspan 2.3 times total length. Slow deep beats; in normal flight, glides and soars on level or slightly bowed wings; but, when slow-foraging over forest or open slopes (see Food), sails, glides and tilts just above tree tops or low over grass with wings slightly or quite markedly raised, and elongated primaries widely splayed and upcurved, hardly ever flapping and often seeming almost to hang still. **Adult** Usually looks all blackish, with surprisingly obvious cere and feet, but inconspicuous marks visible at closer ranges: above, some whitish on face and broken barring on rump, obscure greyer barring on tail; below, faint grey barring on both tail and flight-feathers, small but fairly obvious whitish patch at bases of outer primaries. **Juvenile** Mainly dark above, with barréd rump and obscurely barréd tail, but forehead and sides of head yellow-buff, finely black-streaked on cheeks; below, body and wing-linings stand out as much paler than obscurely barréd dusky flight-feathers and tail, with plain yellow-buff throat and more or less lightly streaked linings, heavily streaked tawny breast and more rufous abdomen; white patches at bases of outer primaries often slightly larger than adult's. **Second-year** Body and wing-linings now largely darkish brown, obscurely darker-streaked, but head still pale.

**CONFUSION SPECIES** Shape, colour and behaviour make adult virtually unmistakable, especially in flight. Only two other eagles are as dark and both have quite different wing shape and wing/tail proportions: adult Greater Spotted Eagle [219] (wing-tips can reach tail-tip when perched, but head bigger, tail much shorter and broader, as well as unbarred, and wings parallel-edged or with slightly bulging secondaries); and melanistic morph of Changeable Hawk Eagle [237] (much shorter-winged, and wing-tips only half down plain tail, with paler to orange-yellow eyes and, in flight below, plain two-tone quills with dark tips and pale bases). In north Indian region, see also Lesser Spotted [218], Tawny [220], Steppe [221] and Golden [224] (which are all paler, shorter-tailed and more even-winged, while all except first have light nape). Juvenile, with pale if variously streaked head, underbody and wing-linings and contrasting dark upperparts and dark-looking quills, is quite different from all plumages of other eagles. Immature could cause more problems when head darkens, but wing shape and proportions always distinctive.

**VOICE** Usually silent, but in breeding season repeated plaintive *keee-keewoo*, or *hee-lee-leeewoo*, uttered from perch or in flight. Shrill yelps, *kip, kip, kip...* or *kee, kee, kee...*, slowly repeated in series during aerial displays, may be version of this. Captive bird gave loud *ah-a* towards evening.

**FOOD** Recorded prey includes birds, small mammals, lizards, frogs and large insects, but apparently specialist

feeder on contents of birds' nests in tree tops, scrub, grassland, and even mouths of caves. (Unusual foot structure – see 'Perched' – probably adaptation to nest-snatching.) Whole nests of smaller arboreal or cave-dwelling birds may be seized, contents including eggs, nestlings and even tight-sitting adults; and eggs, young and occasional adults of larger ground-nesters. Thus, among recorded crop or stomach contents have been eggs or nestlings of bush-quail *Perdicula*, doves *Streptopelia*, and hblers *Carrulax/Turdoides*, while adult bird prey has ranged from swiflets *Aerodramus* to, reputedly, junglefowl *Gallus* and other pheasants. Bats (which hang in caves), phalangers (which hang in trees in Indonesia), and 'six or more young field mice' found in one specimen in India, are among mammal prey recorded and suggest that other creatures and nests may be taken in ways similar to those used for birds. Foraging almost entirely aerial, involving curiously slow sailing and circling, with hardly a beat, just above canopy or grassland, or around mouth of cavern, tilting and sideslipping between crowns of taller trees, diving into clearings or circling into bays at forest edge, sometimes checking and turning; wings are slightly raised, and long primaries upcurved and twisted like speed-reducing flaps. When prey located, drops into foliage (or on to ground), if necessary stretching or clambering along branch. Eggs or young may be eaten where found, or nests of small birds snatched whole and carried off, in which case contents may be examined or eaten in flight. Pair-members often forage together.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, commonly, in pairs. Single and mutual high-circling frequent, and chases sometimes develop; latter may also take form of dodging pursuits between trees. More spectacular aerial displays include plunges 'with wings held down and forward' and, more often, mutual stoops – sometimes quite short, or diving up to 300–400 m before throwing up again – in which bird's outline is heart-shaped with wing-tips almost or nearly meeting over end of closed tail. Undulating sky-dance also occurs, and to-and-fro version in pendulum-like arc described.

**BREEDING** Usually November–March in south India, occasionally as early as September, and December–May in north, even continuing into June in Assam; April–August in Java, perhaps similar in Sulawesi (young bird in nest in July) and Sumatra (occupied nest in August).

Large but neat and compact stick nest, c1.2 m across and 45–60 cm deep, lined with green leaves, high in crown of large forest tree, well hidden by foliage or creepers, often on precipitous slope. Clutch 1 (1–2). Incubation and fledging periods not recorded.

**POPULATION** No real data on densities, but distribution scattered over some 3.6 million km<sup>2</sup>, of which about 55% is Asiatic mainland (mostly rare to uncommon and local) and 45% Indonesian and Malaysian islands (sparsely but widely distributed, sometimes moderately common). Five-figure population would be reached by average somewhere between 1 pair/720 km<sup>2</sup> (probably less than that on much of mainland) and 1 pair/72 km<sup>2</sup> (possibly achieved at all only on larger forested islands, perhaps especially Sulawesi). Deforestation responsible for some known decreases, and remains serious threat.

**GEOGRAPHICAL VARIATION** Two races usually recognised, separated solely on size, but dividing line not always agreed and mainland southeast Asiatic population placed sometimes with one and sometimes with other. Variation essentially clinal, with largest in north-west and smallest in southeast. Here the distributional break in Burma is followed, as the most customary, though birds east of that line are not much smaller than those in Sri Lanka and south India, and both lots are far smaller than in Himalayas.

*I. m. malayensis* (east Burma and southeast Asia into Indonesia) Smaller, sex for sex.

*I. m. penniger* (Indian subcontinent to Assam and west Burma) Medium-sized to large.

**MEASUREMENTS** *I. m. malayensis* ♂ wing 488–510 mm, ♀ 516–525 mm. *I. m. penniger* ♂ wing 520–580 mm, ♀ 538–610 mm; ♂ tail 285–326 mm, ♀ 312–350 mm; ♂ tarsus 69–94 mm. **Weights** *I. m. penniger* ♂ 1 kg (one), ♀ 1.6 kg (one). (In any one population, smallest female apparently always bigger in all dimensions than largest male.)

**REFERENCES** Ali & Ripley (1978), Bishop *et al.* (1994), Bowler & Taylor (1989), Brown (1976), Cheng Tso-hsin (1987), Deignan (1945), Henry (1971), Grimmett *et al.* (1998), Humphrey & Bain (1990), Inskipp & Inskipp (1991), King *et al.* (1975), Lekagul & Round (1991), Mackinnon & Phillipps (1995), Medway & Welb (1976), Meyer de Schauensee (1984), Roberts (1991), Round (1988), Smythies (1981, 1986), Stresemann (1940a), van Balen (1994), van Balen & Meyburg (1994), van Marle & Voous (1988), White & Bruce (1986).

## Accipitridae (s: aquila eagles)

### 218 LESSER SPOTTED EAGLE

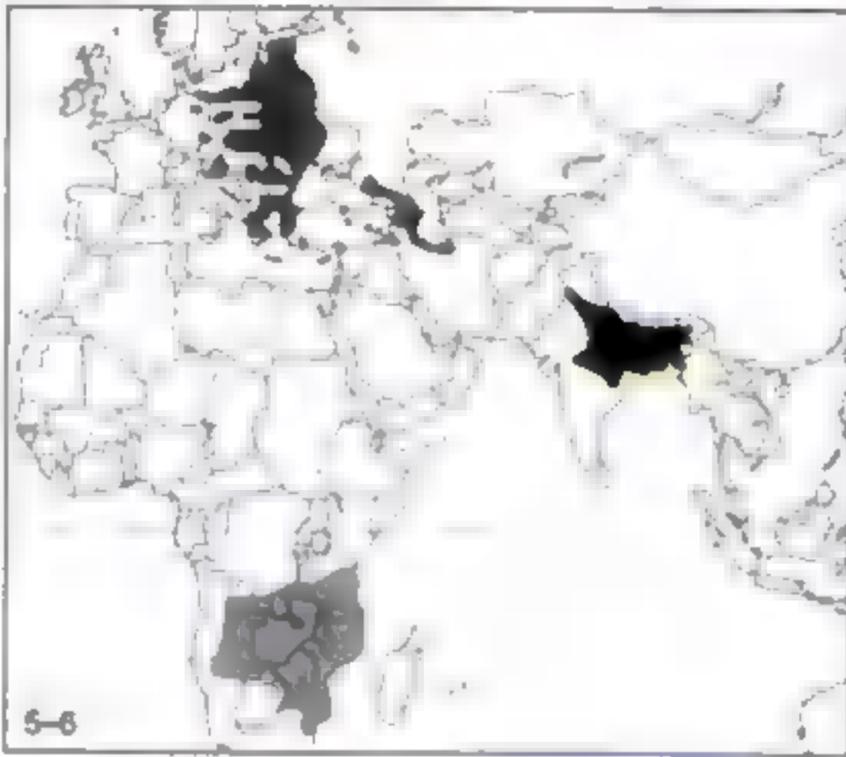
*Aquila pomarina* CL Brehm, 1831

Plate 81

**DISTRIBUTION** Palearctic, Indomalayan and, in winter, also Afrotropical (c60°N to 21°N or, possibly, only 27°N, winter mainly 50°N to 29°S); order 5–6; while locally not uncommon, or even common, in optimum habitat, generally scarce to rare; in Indian subcontinent very rare and probably endangered. Breeds central and east Europe and extreme southwest Asia, with disjunct

population in south Asia; northeast Germany and Poland south through Slovakia and Hungary to Balkans, eastward through Baltic Republics to Belarus, at least westernmost Russia, Ukraine and Caucasus and, in south, locally Romania, Bulgaria, Turkey and north Iran; farther east, extremely local resident northeast Pakistan (only handful of sight records) eastward through north India

(Gangetic Plain, south Gujarat, south to southern Madhya Pradesh and north Orissa) and south Nepal to Bangladesh, Assam and possibly Manipur (but present eastern and southern limits unclear, possibly extinct in east).



**MOVEMENTS** Indian population largely sedentary, with limited juvenile dispersal but presumably some wandering; may occasionally reach northern Burma. Apart from isolated winter records from Asia Minor and southeast Europe, western population winters in Africa: chiefly southern Tanzania across to northwest Namibia and south to northeastern South Africa, with few around Rift Valley lakes in south Ethiopia and north Kenya and occasional individuals further west in Chad to Cameroon. Leaves breeding grounds from around mid September, returning late March and April: except for few seen at both seasons migrating across central Mediterranean (corresponding to West African winter records?), almost all pass through Levant, where several counts in Israel, particularly 141,000 in west in autumn 1983, as well as some unpublished figures for Bosphorus and Suez, have exceeded contemporary estimates of total world numbers (see Population). One Latvian-bred juvenile, tracked by satellite, took about a month to move 6,000 km to Sudan, where stayed for over six weeks before flying on to Kenya (cf. Greater Spotted Eagle [219]).

**HABITAT** Breeds in patchy mature open woodland, whether deciduous, mixed or coniferous, always with adjacent open areas and generally remote from human habitation: in north and east parts of European range mostly moist lowland forest, including swamp woodland bordering wet meadows, bogs or other wet areas (cf. Greater Spotted Eagle [219]), elsewhere usually drier forest and, in higher parts of southeast Europe, also dry wooded hillsides and forest-steppe; in Indian region, uses lowland woodland interspersed with cultivation. In African winter quarters prefers moist open or sparsely wooded savanna, where often accompanied by migrant Steppe Eagles [221]. Sea-level to c400 m, locally to 800 m, and in some mountain regions to 1,800 m or even 2,200 m (though below 1,000 m in Nepal).

**FIELD CHARACTERS** Medium-sized eagle, mostly brown and blackish as adult but juvenile spotted on wings, with relatively small buzzard-like head, small bill for *Aquila* (short gape-line, round nostrils), typically

long-looking legs closely feathered (tight trousers). Perches rather upright or more obliquely, frequently on exposed tree branch, often descending to ground and walking around; wings about level with tail-tip. Dimorphic (pale morph very rare). Sexes similar, but female up to 10% larger and at least that amount heavier; juvenile distinct, immature rather less so; as adult by fifth-sixth year.

**PERCHED Adult** Above, basically brown to reddish-brown or golden-brown, usually darker on mantle and scapulars and paler on wing-coverts (degree of contrast and depth of colours dependent on wear), but often looks more uniform, head sometimes with paler or darker nape; wings and tail blackish, only narrowly pale-tipped; below, ground colour much as upperparts, crissum a little lighter. (Very rare pale morph has buffish to pale rusty-brown body and forewing-coverts.) **Juvenile** Above, dark brown with paler lesser and median wing-coverts, and strongly contrasting whitish-tipped blackish greater coverts, flight-leathers and tail, tips to greater (sometimes also some medians) forming spot-hands along wing (but see Geographical Variation); head with usually well-defined golden-buff to rufous nape-patch; below, varies from pale buff-brown with dark streaks and spots (when often also pale-spotted above on scapulars and mantle to crown) to darker, plainer brown, but crissum paler creamy. **Immature** By first winter pale tips almost worn off, then much closer to adult in appearance, but second-winter, following moult, more juvenile-like but for smaller white tips to new greater coverts (on some heavily marked birds, medians and lessers also pale-tipped); from third year resembles adult, but generally more patchy-looking (when throat usually darker), until fully adult normally from about September of fifth year.

**Bare parts** Adult eyes yellow or yellow-brown (brownier in India), juvenile brownier. Cere and feet yellow.

**FLIGHT** Rather large, fairly compact raptor with rounded projecting head small-looking for *Aquila*, similarly smallish bill, relatively short and narrow parallel-edged wings with six shortish fingers at rounded ends (p1 very short), longish and quite broad rounded tail about three-quarters length of wing-base (compared with adult, juvenile narrower-winged and slightly longer and narrower-tailed); wingspan 2.5 times total length. Relatively shallow beats quicker than in Greater Spotted and Steppe Eagles [219, 221], so flight lighter than those; soars and glides on flattish or slightly arched wings with hand drooped, often appearing somewhat hunch-backed, spread fingers rarely at all striking. **All plumages** On upperwings, coverts always contrastingly paler than flight-leathers, primaries with distinct white bases (primary-patch most prominent on younger birds); on underwings, light brown to darker medium brown linings either diagnostically paler than or concolorous with flight-leathers (cf. Greater Spotted Eagle), and double crescent on hand formed by white bases to primaries and to greater primary coverts (very rarely, one or even both crescents absent); with few exceptions, secondaries and innermost primaries densely dark-banded throughout, but visible only at closest ranges. **Adult** Rather variable shades of brown above, with narrow creamy U above tail, usually rather paler on head and often on back (though occasionally reverse), but almost always highly contrasting paler wing-coverts against blackish-brown flight-leathers, inner primaries

earlier nests ever described), is patchily distributed and, while doubtless under-recorded, is at best very scarce, with probably most (though still extremely few) in Gangetic Plain; it may even be extinct in easternmost parts, where never anything but rare; surviving population perhaps does not exceed some hundred or so pairs, though this is a mere guess. Otherwise, western nominate race is distributed over maybe some 4 million km<sup>2</sup> (much of which is, however, unsuitable habitat), and in mid 1980s was estimated at c 100,000 birds, with most in northeast in Poland (1,300), Baltic Republics (1,650–1,700) and Belarus (3,000–3,500). A decade later, numbers in this European stronghold were put at some 10,000 breeding pairs, or c 30,000 birds at end of breeding season, but it was admitted that there could have been a serious underestimate of the western Russian population. An unknown number breeding in Asia Minor to north Iran needs to be added to this to produce a total, but it seems highly unlikely that that would exceed the 1980s figure unless the true range were considerably greater than currently realised. Highest overall densities are in the northeast, where 1 pair/16.4–28 km<sup>2</sup>, and in optimum habitat in Latvia and Slovakia 1 pair/9–10 km<sup>2</sup>, while in some places nests are only 1 km apart. If one-fifth of known range represented suitable habitat, and density in those areas averaged 1 pair/30 km<sup>2</sup>, that would produce a figure of 26,000 pairs. But one-fifth seems over-generous, given the species's rather specialised habitat requirements; furthermore, the count of over 140,000 birds on autumn passage through Israel (see Movements) would require a population of 40,000–50,000 breeding pairs or, on the same basis, an impossible 1 pair/18 km<sup>2</sup>. A huge area of apparently suitable habitat exists in western Russia, adjacent to known range, and it is possible that the species breeds there in good numbers, but further investigation is clearly needed. Like the Indian race, the western one has undergone a significant reduction in numbers and range since the 19th and early 20th centuries, caused mainly by persecution but also by drainage of wet pastures and felling. These problems continue, hunting taking particularly heavy toll of migrants in Syria and Lebanon (possibly thousands shot annually for 'target practice').

Average breeding productivity (0.5–0.8/pair) has been successfully increased by rearing second chicks artificially.

**GEOGRAPHICAL VARIATION** Two races, well separated geographically.

*A. p. pomarina* (Europe, southwest Asia) See Field Characters; adult eyes yellow; young always spotted, with pale nape-patch.

*A. p. hastata* (Indian subcontinent) Marginally longer-winged, longer-legged and larger-billed; adult eyes browner; juvenile and immature lack pale nape-patch (and described by some authors as unspotted or nearly so, but this appears erroneous).

In addition, very rare pale morph, sometimes referred to as '*pallida*' or '*fulventris*' or even, confusingly, '*fulvescens*' (see Greater Spotted Eagle [219]), has buffish to rusty-brown body and lesser and median wing-coverts.

**MEASUREMENTS** *A. p. pomarina* ♂ wing 446–478 mm, ♀ 469–505 mm; ♂ tail 202–252 mm, ♀ 219–251 mm; ♂ tarsus 88–98 mm. *A. p. hastata* ♂ wing 470–505 mm, ♀ 495–508 mm; ♂ tail 230–248 mm; ♂ tarsus 100–104 mm. **Weights** *A. p. pomarina* ♂ 1–1.4 kg, ♀ 1.3–2.2 kg.

**REFERENCES** Abuladze (1994b), Baumgart (1979, 1980, 1994), Bergmanis (1989, 1994), Bergmanis *et al.* (1990), Brooke *et al.* (1972), Brown *et al.* (1982), Christensen & Sørensen (1989), Clark & Khan (1994), Cramp & Simmons (1980), Danko (1990), Drobelis (1994), Forsman (1991, 1999), Gensbøl (1986), Gentz (1965, 1967), Golodushko (1958, 1959, 1961), Goodman *et al.* (1989), Gorban (1994), Hagemeyer & Blair (1997), Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1985), Harasathy *et al.* (1994a, b), Hollom *et al.* (1988), Inskipp & Inskipp (1991), Kouzmanov (1994), Matthes & Neubauer (1977, 1987, 1989), Meyburg (1970, 1971, 1973, 1974a, 1991), Meyburg *et al.* (1993), Mundi & Uhlig (1994), Neubauer (1991), Palásthy & Meyburg (1973), Pcola (1991), Pearson & Meadows (1979), Porter *et al.* (1981, 1996), Prakash (1994), Reistetter (1991), Rodziewicz (1994), Shrihai (1986), Shrihai & Christie (1992), Shrihai *et al.* (1996), Siewert (1932), Sládek (1993), Smythies (1986), Szebhik & Meyburg (1979), Svensson (1975, 1987), Thiollay (1989c), Uhlig (1994), Vlachos & Papageorgiou (1994), Volke (1994), Wendland (1932, 1951, 1953, 1958, 1959), Zimmerman *et al.* (1996).

## 219 GREATER SPOTTED EAGLE

### *Aquila clanga* Pallas, 1811

Plate 81

Other name: Spotted Eagle

**DISTRIBUTION** Palearctic and Indomalayan, in winter also marginally Afrotropical (66°N to c 25°N, winter 60°N to 0° but mainly 35°N to 5°N); order 4+; little known and at best very uncommon, mostly rare and declining, and vulnerable, but status in east poorly understood. Breeds sparsely and with greatly fragmented distribution in north and east Europe and central and south Asia: south Finland (no recent breeding), Latvia and Lithuania (almost extinct in both), Kaliningrad, northeast Poland, Belarus, Moldova, Romania (recently extinct) and Ukraine (almost extinct), across central Russia (north to Karelia and northernmost taiga, south to northern fringe of steppes) eastward to

Ussuriland, south to Kazakhstan, northwest China (west Sinkiang), Mongolia and northeast China (Manchuria, possibly south to Liaoning); north Iran (presumably still a few); south Pakistan (few pairs), northern India (rare and very local Rajasthan, ?Gangetic Plain, possibly Assam), formerly also Bangladesh and Manipur.

**MOVEMENTS** Migratory, moving relatively short or longer distances to wintering grounds in Europe (south France, especially Camargue, some dozen records Spain, also Italy eastward, sometimes central Europe, e.g. Germany, regularly north to Sweden), north Africa (few Morocco, scattered records in east from Egypt, mainly Nile valley, and Sudan to Ethiopia and Kenya), Middle East (odd ones in most areas, but especially Arabia) and

arc, or from juvenile Imperial (see above). In eastern range, mainly in winter, bear in mind also Indian Black Eagle [217] (slimmer, paddle-shaped wings, tail longer and clearly barred).

**VOICE** Quite noisy when breeding, and often very vocal in winter, too, especially when in small loose groups. Calls similar to those of Lesser Spotted [218], if somewhat lower in pitch. Commonest is a thin *kyack, kluk, tyuck* or *dyip*, repeated two to three times, sometimes more, like barking of small dog. Few other data.

**FOOD** Both diet and hunting methods similar to those of Lesser Spotted [218], but prey generally somewhat larger (mostly up to 250 g) and more birds: mainly small mammals, birds, amphibians, reptiles, occasionally small fish, also insects, carrion. In keeping with preferred habitat, water-associated vertebrates figure prominently: in several Russian studies, water voles *Arvicola termitia*, waterbirds, frogs and toads predominated, and common voles *Microtus arvalis* also frequently taken; in India many frogs, as well as wide range of waterfowl such as coots *Fulica* and ducks. Reptiles include both snakes and lizards. In winter, insects (mainly locusts, termites and grasshoppers) and carrion often important; attracted to grass fires and to swarming locusts, often with other predators (e.g. Steppe Eagles [221]). Most prey taken on ground. Hunts mainly on wing, quartering open ground or soaring high above, dropping or diving steeply when prey sighted; scatters waterfowl by swooping low over flock, then selecting isolated individual for attack. Sometimes still-hunts from perch, and often hunts on foot. Pirates food from other raptors.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, in winter sometimes in small to larger flocks at food sources, and 'huge numbers' reported feeding on locusts in November in northeast Africa; on migration often singly, sometimes twos or threes, occasionally smallish flocks. Displays not well known, but include single and mutual high-circling, soaring high, and male diving down on half-closed wings in long arc towards soaring female, all with much calling.

**BREEDING** Late April–August, in Pakistan also November–March. Large stick nest, c70 cm–1.1 m across and up to 1 m deep, lined with green leaves and grass which added continuously throughout cycle, at 5–25 m (mostly 8–12 m) at or near top of usually large broadleaf tree just inside forest, but in treeless regions also in low bushes and in west Siberian steppe down to 3 m in willow *Salix* scrub. Clutch 2 (1–3). Incubation 42–44 days. Fledging 60–67 days, with dependence up to 30 days.

**POPULATION** Despite vast breeding range, covering at least 8 million km<sup>2</sup> in a band from the Baltic Sea in Europe right across to the Pacific Ocean, with minor outpost in northern Indian subcontinent, this eagle is

found in such extremely low densities, and is so widely scattered and little studied, that any estimate of population based on range would be quite meaningless. Few reliable data include 11 breeding pairs in c2,000 km<sup>2</sup> (c1 pair/180 km<sup>2</sup>) in northeast Poland and some 20–30 in 85,000 km<sup>2</sup> of European Russia (1 pair/2,833–4,250 km<sup>2</sup>). With probably no more than 900 pairs west of Urals, and the species being rare east of there, and in the Indian region, a population above four figures can surely be ruled out. It should be added that BirdLife International in 2000 put the whole Russian population, across both Europe and Asia, at 2,800–3,000 pairs and suggested that the grand total for the species, which is now considered globally vulnerable, 'is probably less than 10,000 mature individuals', but these figures seem high to us. Has disappeared from many once regular breeding areas in Europe, including Slovakia, Hungary, Romania, Bulgaria, former Yugoslavia and north Israel, and is still declining everywhere, as in Ukraine (until recently 40–50 pairs, by 1995 almost extinct); and throughout Asia, though no hard data, no indication of anything other than steady decrease. Main causes, both in past and continuing, are disturbance and destruction of habitat, primarily drainage of wetland areas and felling of river-valley woodland, as well as direct persecution and accidental poisoning. Nevertheless, unresolved problems of accurate field identification (see Confusion Species) possibly mask real trends.

**GEOGRAPHICAL VARIATION** Monotypic. Pale variant 'fulvescens', with buffish body and wing-coverts, uncommon everywhere, and rare in west of range.

**MEASUREMENTS** ♂ wing 477–517 mm, ♀ 507–542 mm; ♂ tail 227–249 mm, ♀ 235–268 mm; ♂ tarsus 97–105 mm, ♀ 96–109 mm. **Weights** ♂ 1.7–1.9 kg (three), ♀ 1.8–2.5 kg (four).

**REFERENCES** Ali & Ripley (1978), Bergmanis (1989, 1994), BirdLife International (2000), Bokotej (1994), Brazil (1991), Brown *et al.* (1982), Cheng Tso-hsin (1987), Clark (1988), Clark & Schmitt (1999), Collar *et al.* (1994), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Etchécopar & Hûe (1978), Flint *et al.* (1984), Forman (1991, 1999), Galushin (1962), Gænsbøl (1986, 1995), Glotov (1959), Goodman *et al.* (1989), Gurban (1994), Haas (1956), Hagemeyer & Blair (1997), Handrinos & Akriotis (1997), Haraszthy *et al.* (1994a/b), Hoffmann (1931, 1932, 1935), Hollom *et al.* (1988), Inskipp & Inskipp (1991), Knystautas (1993), Król (1983), Löhmus (1998), Markgren & Markgren (1960), Medway & Wells (1976), Meyburg & Pielowski (1991), Meyburg *et al.* (1995), Mishchenko (1984), Moltoni (1943), Nielsen & Christensen (1969), Pererva (1989), Porter *et al.* (1981, 1996), Quednau (1930), Roberts (1991), Rogacheva (1992), Shirihai (1996), Shirihai & Christie (1992), Shirihai & Yekutieli (1991), Shirihai *et al.* (1996), Smythies (1986), Svensson (1975, 1987), Thiollay (1989c), Verheugt *et al.* (1993), Volke (1994), von Greve (1910), Wendland (1959), Zimmerman *et al.* (1996).

## 220 TAWNY EAGLE

*Aquila rapax* (Temminck, 1828)

Plate 80

**DISTRIBUTION** Afrotropical, Indomalayan and, marginally, Palearctic (34°N or, possibly, 36°N to 31°S); order 6; widespread and generally common to fairly

common over most of range, rarer and declining in some places. Northwest and sub-Saharan Africa and south Asia, in three discrete populations: south-central



southwest Russia (Stavropol to Astrakhan) eastward through Kirghiz Steppes and north Kazakhstan to Transbaikalia and west Manchuria, south to Aral Sea, Tien Shan, northern Tibet and Mongolia.

**MOVEMENTS** Entirely migratory, wintering in eastern and, to lesser extent, southern Africa (west to south Sudan, easternmost DR Congo, central Angola and north and east Namibia, south to Botswana, Swaziland and northern South Africa, including former Transvaal and north Natal), with fewer also in Middle East (Arabia, regularly eastern Iraq, odd ones north to Turkey) and occasionally in southeast Europe and southwest Russia; and in south Asia from Afghanistan and Indian subcontinent (mainly south to Madhya Pradesh and south Orissa, rare farther south) east to Burma, with recent wintering records also in peninsular Malaysia and north Vietnam. Southward movements from about October, on fairly broad fronts, western populations passing both north and south of Caspian Sea, with main concentrations crossing into Africa at either end of Red Sea after having flown through Israel and Suez or straight across Arabia to Yemen (most at southern end of Red Sea, where 76,000 over Babel-Mandeb Straits in autumn 1987, but, at northern end, 65,000 over Suez in 1981). Remains in Africa until January/February, most immatures apparently farther south and partly segregated from adults, but all generally nomadic; returns earlier than other eagles, from February or even late January in southern Israel, continuing through March with stragglers to mid May (peak over Eilat of 75,000 in spring 1985). Movements of eastern nominate *nipalensis* not well known, but in Nepal main passage apparently from third week October; some almost certainly migrate west to winter with western populations in northeast Africa. Vagrants recorded in many European countries, north to Scandinavia and Finland and west to Spain.

**HABITAT** Breeds in open dry country, typically steppe, flat plains, arid grassland, semi-desert, even extending into desert edge, mostly at lower levels but in eastern range also poorly vegetated dry rocky hillsides and upland valleys, though generally avoiding mountain areas. In winter, inhabits mostly grassland and savannah in Africa, where also enters dry woodland, but in south

Asia, while occurring in open country and around large lakes, seems to accept, or even prefer, more heavily wooded habitats (though recent first records for peninsular Malaysia thought by observers to be the result of deforestation creating increased open habitat). Mostly lowlands, but to 2,300 m and, locally even to 3,000 m in mountains; on passage, to 4,500+ m and in Nepal even as high as 7,900 m.

**FIELD CHARACTERS** Large, bulky, robust-looking eagle, as adult mainly dark brown, with longish thick neck and relatively smallish head but strong bill (long gape-line; see fig. 49, oval nostrils), long wings, longish rather rounded tail, markedly well-feathered legs. Perches fairly upright and openly, on trees, posts or other suitable low lookout such as small mound or straw-pile, often on ground, where may stand for long periods during day, also walking with horizontal posture, and often tame; wing-tips reach or just exceed tail-tip. Sexes similar, but female up to 15% larger and at least that amount heavier; juvenile and younger immatures distinct; as adult after fifth or sixth year, sometimes not until seventh autumn.

**PERCHED Adult** Variable brown above and below, with darker centres to greater coverts and, especially in nominate race, normally prominent paler rufous or yellow-brown patch on nape and hindcrown; any paler areas on back and uppertail-coverts concealed when perched; gape-line to level with rear of eye (often emphasised by dark border against paler chin) longer than on other *Aquila* eagles including Tawny [220] (see fig. 49) and, combined with deep-set eyes, gives rather fierce facial expression; thin paler tips to inner secondaries and tail, and dark barring on flight-feathers and tail, not really obvious when perched. **Juvenile** Above, brown to grey-brown but for generally rufous-buff nape-patch (mainly on eastern race) and conspicuously and broadly whitish-tipped black greater coverts, wings and tail, and narrower creamy band on (brown) medians; white uppertail-coverts generally concealed; underparts as upperparts, or sometimes more tawny-buff. **First/second-year** Much like juvenile, but by end of first winter pale tips to

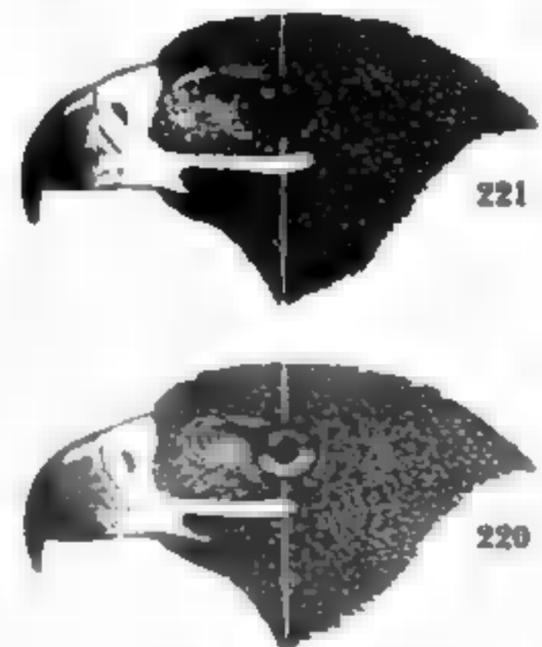


Fig. 49. Comparison of lengths of gapes of Steppe Eagle *Aquila nipalensis* [221], a Palearctic migrant to Africa and India during the northern winter, and Tawny Eagle *A. rapax* [220], a resident in both. Whether the gape ends close to an imaginary line down through the middle of the eye, or well beyond it, is usually clear enough on a perched bird.

Other names: Eastern Imperial Eagle (n nominate), Spanish Imperial or Adalbert's Eagle (*adalberti*)

**DISTRIBUTION** Palearctic and, in winter, also Afro-tropical and Indomalayan (55°N to 35°N, winter 30°N to 3°S); order 4; within wide distribution everywhere very local, uncommon to rare, and vulnerable, Spanish race *adalberti* possibly endangered. Breeds in two separate ranges (and often treated as two distinct species), in southwest Europe and perhaps still northwest Africa and, as discrete population, in southeast Europe and western and central Asia: south Portugal (no recent breeding, presumed extinct), central and southwest Spain, formerly also northeast Algeria (extinct) and north Morocco (recent possible breeding records); then, in greatly fragmented distribution, from east-central and southeast Europe (easternmost Czech Republic since 1998, Slovakia, north Hungary, Croatia, Serbia, Macedonia, Romania, Moldova, Bulgaria, north Greece) through Ukraine and eastward across central Russia (southward from southern edge of taiga) to Lake Baikal and possibly to central Transbaikalia, extending south to Georgia, Armenia and Azerbaijan, Turkmenistan, Uzbekistan, southern Kazakhstan, northwest China (west Sinkiang) and north Mongolia, also locally northwest, central and east Turkey, Cyprus and north Iran, formerly Afghanistan and Pakistan (no recent breeding records).

**MOVEMENTS** In Iberia basically sedentary, but juveniles disperse up to 350+ km, some crossing Strait of Gibraltar to winter in northwest Africa (presumably the source of possible recent reoccupation of Morocco; see Distribution). At least some adults of nominate eastern race resident in western parts of breeding area, including Slovakia and Hungary, Asia Minor and Cyprus, and

overwintering reported in eastern range as far north as Mongolia; but this race otherwise largely a short- to medium-distance migrant, mid September–October/November and February–April/May, though seen in only very small numbers at regular migration points such as Israel and southwest Arabia, wintering locally in northeast Africa (Nile valley, irregularly down to south Kenya, once north Tanzania), throughout Middle East (south to Yemen), and in Indian subcontinent (eastern Pakistan, eastward through south Nepal to Bangladesh, and south to Gujarat), Thailand and north Indochina (recorded also across Chinese border in southwest Yunnan, and recently in southern Laos, too), since early 1990s peninsular Malaysia south to Singapore, and in east and southeast China (east Manchuria, coastal strip from Hebei down to Guangdong, Sichuan), with occasional wintering birds in Korea and Japan (mainly Honshu). Vagrants recorded in over 20 countries west to Poland, Sweden, Denmark, Germany, Netherlands, France, Italy, Malta and Libya.

**HABITAT** Rather open country with scattered trees or more closed woodland, often around or near wetlands, foraging in open areas, including cultivation and adjoining marshland. Iberian race occupies plains and coastal dunes with dry oak or pine woodland, as well as low hills and mountain slopes with Mediterranean scrub, generally in areas remote from habitation and human activity and with plentiful supply of rabbits (see Food). Eastern nominate race inhabits steppe and forest-steppe, typically open woodland, river valleys and even agricultural areas with isolated trees or wooded patches, extending into semi-desert in Turkestan region, mainly in lowlands but, in parts of central Asia where Golden Eagle [224] absent, also in forested lower mountains and



predators similarly affected, e.g. Red Kite [37], Lammergeier [53], Egyptian Vulture [54], Monk Vulture [63]). Nominate *heliaca*, once very common locally (e.g. Bulgaria, where c1 pair/50 km<sup>2</sup> near Sofia), has also shown considerable and continuing decline since 1950s and, while huge range still covers 6–7 million km<sup>2</sup>, it is extremely patchily distributed and is now extinct or near-extinct in so many areas (including former southern outpost in Pakistan) that pointless to try to estimate population on basis of range and the few available data on densities: apart from perhaps 600–900 pairs in European Russia, only 220–320 pairs remain in eastern European range (30–35 in Slovakia, 36 in Hungary, 14+ in former Yugoslavia, 0–2 in Greece, 15–20 in Bulgaria, probably few in Romania, 10–12 in Moldova, 50–75 in Ukraine, few in Turkey, 9–11 in Georgia, 40–50 in Azerbaijan, c10 in Armenia), while in Asia estimates variously include 750–800 pairs in Kazakhstan and 800–1200 pairs for Asian part of former USSR (but also, confusingly, 500–1,000 pairs for entire former USSR); recorded densities in south-central Siberia east of Minusinsk depression of c1 pair/200 km<sup>2</sup>, but on west side surprisingly high at 40 km<sup>2</sup> (in forested parts alone even 15.4 km<sup>2</sup>), though this exceptional; and species said to be rare elsewhere in region; total world population probably few thousand pairs, perhaps no more than c2,000 pairs, and the numbers of individuals thought hardly likely to reach five figures. Slow increase evident only in Hungary and, especially, Slovakia, where conservation and careful management since mid 1980s have improved productivity (up from 1.0 young to 1.4 in newly occupied nests, from 1.7 to 2.3 in established sites) and density (1 pair/146 km<sup>2</sup> in one area). Threats similar to those faced by *adalberti*, and some amplified by migratory habits (many, especially young birds, shot on passage, particularly in Syria), while additional problems include taking of nestlings for captive-bird trade, felling of old forest stands, and reduction of main prey population (susliks) through change in land-use. In Hungary, despite slight population growth (1.5 young/successful nest), 36% of breeding attempts fail. Both nominate and *adalberti* clearly vulnerable at very best, and generally in decline, but active conservation could assure their future.

**GEOGRAPHICAL VARIATION** Two races, differing in morphology and ecology to an extent wherer probably better treated as separate species (see especially Hiraldo *et al.* 1976 and Gonzalez *et al.* 1989), though this has not

yet found universal favour except on conservation grounds.

**A. h. heliaca** (southeast Europe, Asia) See Field Characters.

**A. h. adalberti** (Iberia, formerly NW Africa) Marginally bulkier, heavier, more compact, head and bill bigger, wings perhaps proportionately shorter and broader-based, but tail longer and slightly rounded; adult often less buff on head, with white inner leading wing-edges as well as bigger shoulder-braces; juvenile rusty to rufous (not buffish) with no or limited streaking.

If the two are treated as distinct, then they form a super-species.

**MEASUREMENTS** *A. h. heliaca* ♂ wing 540–622 mm, ♀ 565–661 mm; ♂ tail 260–308 mm, ♀ 270–311 mm; ♂ tarsus 91–98 mm, ♀ 97–107 mm. *A. h. adalberti* ♂ wing 561–609 mm, ♀ 590–661 mm; ♂ tail 267–309 mm, ♀ 286–315 mm; ♂ tarsus 93 mm (one), ♀ 107–111 mm (five). **Weights** *A. h. heliaca* ♂ 2.45–2.72 kg (five), ♀ 3.16–4.53 kg (five). *A. h. adalberti* ♂♀ 2.5–3.5 kg.

**REFERENCES** Abuladze (1994b), Ali & Ripley (1978), Alonso *et al.* (1987), Beaman & Porter (1985), Belik & Galushin (1997), Bergier (1987), BirdLife International (2000), Botodid (1984), Bragin (1983, 1987, 1999), Brazil (1991), Brown (1976b), Brown III *et al.* (1982), Calderón *et al.* (1984, 1987, 1988), Clark & Schmitt (1999), Collar *et al.* (1994), Cramp & Simmons (1980), Danko (1994a/b), Delibes (1978), Dementiev & Gladkov (1951), Ferrer (1992, 1993a/b), Ferrer & Calderón (1990), Ferrer & Hiraldo (1991), Flint *et al.* (1984), Forsman (1999), Frazao (1984), Garzón *et al.* (1984), Génsbol (1986, 1995), González LM (1991a/b, 1996), Gonzalez LM & Grande (1991), González & Hiraldo (1987), González *et al.* (1985, 1987, 1989a/b/c, 1990), Hagemeijer & Blair (1997), Hallman (1994), Handrinos & Akriotis (1997), Haraszthy *et al.* (1994), Heredia (1996), Heredia *et al.* (1985), Hiraldo *et al.* (1976), Inskipp & Inskipp (1991), Krystantax (1993), Lobachev (1960, 1961, 1967), Magyar *et al.* (1998), Meyburg (1974c, 1975, 1982, 1987, 1989a), Meyburg & Garzón (1973), Meyburg & Meyburg (1991), Meyburg *et al.* (1994), Mitchev & Petrov (1979), Mountfoot (1958), Nikitina (1991), Palma (1985), Pancheshnikova (1983), Petrov *et al.* (1994), Porter *et al.* (1981, 1996), Roberts (1991), Rogacheva (1992), Ryabtsev (1989), Shirihai (1996), Shirihai & Christie (1992), Shirihai *et al.* (1996), Simeonov & Petrov (1980), Sládek (1959d), Solomonin (1970, 1974), Soto-Largo & Martí (1994), Suetens & van Groenendael (1971), Svehlik & Meyburg (1979), Tapfer (1973), Ushkov (1949), Valverde (1960), Vavári (1989), Veiga *et al.* (1984), Vetrov (1991a/b), Vielliard (1974), Voloshin (1949), Zaharny (1968), Zimmerman *et al.* (1996).

## 223 GURNEY'S EAGLE

*Aquila gurneyi* GR Gray, 1860

Plate 78

**DISTRIBUTION** North Australasian (0°, or perhaps 3°N, to 11°S); order 4; little known and, despite soaring behaviour, rather seldom seen, so probably uncommon. Endemic to mainland New Guinea (both Irian Jaya and Papua) and adjacent islands, perhaps west to Moluccas (at least Seram); widely scattered records chiefly, but by no means entirely, within 15 km of coast of mainland New Guinea, otherwise on such satellites as Goodenough (d'Entrecasteaux group) to southeast, various

islands of Torres Strait to south, Kepulauan Aru to southwest, and especially Misoöl, Salawati, Waigeo and Yapen to northwest; only slightly farther west, Moluccas also generally included within species' range, on basis of records from Morotai, Halmahera, Ternate, Bacan and Ambon, but most of those relate to 19th century and others questioned (White & Bruce); much more recently, in 1980s, adult and immature over Seram in September (Bowler & Taylor).



**MOVEMENTS** Adults likely to be fairly sedentary and juveniles more dispersive. Species occasionally recorded on more southerly islands of Torres Strait within Australian territory and, though soaring raptors often reluctant to cross water, at least some island records elsewhere may similarly relate to wanderers; but no regular seasonal movements.

**HABITAT** Primary rainforest, swamp forest and at times nearby cultivations and clearings, mainly coastal and lowland, also visiting adjacent shores and islands, but sometimes far inland and at much higher altitudes. Mostly sea-level to 1,000 m, sometimes to 1,500 m, rarely as high as 3,000 m.

**FIELD CHARACTERS** Large, solid eagle, all blackish-brown as adult, with fairly big bill and head, and rather slim feathered legs. Perches openly on tree top or exposed branch, or concealed inside canopy; long wings extend over half down longish tail. Sexes similar and female only 2-11% larger; juvenile distinct, and apparently at least two other immature stages; probably not fully adult for four to five years.

**PERCHED Adult** Entirely blackish-brown, apart from paler tarsal feathering; any other differences in shade on body or upper surfaces of wings and tail largely due to combinations of old and new feathers. **Juvenile** Apart from browner back, scapulars and wing-coverts with much grey and buff marbling, and faintly barred blackish tail and flight-feathers, differs strikingly in whole head, mantle and underparts being cinnamon-tawny, with some darker streaking, shading into plain creamy abdomen and legs. **Immature (third- to fourth-year)** Less marbled above and head and underbody paler sandy or cream, more or less heavily mixed with brown or blackish on crown, cheeks and breast. **Bare parts** Adult eyes dark yellow, juvenile brown becoming pale yellow. Cere greyish. Feet yellow.

**FLIGHT** Large raptor with protruding head, long and broad well-fingered wings almost parallel-edged when soaring but with somewhat bulging secondaries, and longish rounded or slightly wedge-tipped tail; wingspan 2.2 times total length. Slow deep powerful beats; glides and soars on flat or barely raised wings. **Adult** All blackish-brown but for paler greyish mottling at bases of undersides of flight-feathers and tail. **Juvenile** Marbled complex of various shades of brown, grey and buff above, with blacker flight-feathers and tail, but head, underbody and wing-linings cinnamon-tawny, in contrast to

dark-banded greyish tail and flight-feathers with black-tipped primaries. **Immature (third- to fourth-year)** Differs in paler sandy to cream head, underbody and wing-linings mostly overlaid with strong brown streaking.

**CONFUSION SPECIES** Adult needs to be distinguished, particularly in southernmost New Guinea and islands of Torres Strait, from Wedge-tailed Eagle [225], which, when perched, is larger and lankier, with bigger bill, still longer tail and wings, and creamy feet; and, when soaring and gliding, has greater span with narrower wings curved upwards and edges of diamond-shaped tail similarly dished. In most of range, juvenile and immature could be confused only with corresponding plumages of White-bellied Fish-eagle [42], but that has still more protruding head, shorter and broader wings (with whitish diagonals and windows, more curved trailing edges, and held in stiff V when soaring or gliding) and much shorter pale tail, as well as bare grey legs. Although comparable in size, New Guinea Eagle [215] much paler, particularly below, with long bare legs and quite different proportions: short rounded wings, longer tail and larger head. In Moluccas, species must also be separated from Indian Black Eagle [217], which generally slightly smaller, with more paddle-shaped wings narrowed at base and held in V during gliding and soaring; adult similarly all blackish-brown but has variable whitish on rump and around eyes and bill, and usually more distinct white patch at base of primaries; juvenile, with barred rump, similarly has tawny-buff head, underbody and wing-linings, but these boldly streaked blackish (except on face) and all clearly paler than dusky-banded flight-feathers and tail.

**VOICE** Usually silent. Only call described is medium-high, slightly nasal, downslurred piping, repeated about once per second.

**FOOD** Few data, based generally on local information. Said to feed largely on such mammals as cuscuses (Phalangeridae), which perhaps likely to be snatched from trees by pounce during low quartering or transect flights. Coates referred to one carrying 'a large, long-tailed animal, either a monitor lizard or a marsupial'.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs; occasional trios may be family groups. No aerial or other displays recorded, other than frequent soaring or high-circling.

**BREEDING** Few data. Builds substantial structure of sticks high in tall forest tree. No information on clutch size, or incubation and fledging periods.

**POPULATION** Although liable to occur anywhere over at least 700,000 km<sup>2</sup>, main coastal and subcoastal range probably well under 100,000 km<sup>2</sup>. No indications of density, but generally described as 'low' or 'sparse', so four-figure population seems reasonable expectation. Deforestation and disturbance likely to be main long-term threats.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 510-520 mm, ♀ 530-568 mm; ♂ tail 316-347 mm, ♀ 340-365 mm; ♂ tarsus 90-105 mm, ♀ 100-110 mm. **Weights** Immature ♀ 3.06 kg (one).

**REFERENCES** Amadon (1978), Berthel *et al.* (1986), BirdLife

International (2000), Bowler & Taylor (1989), Brown (1976b), Coates (1985), Diamond (1985), Finch *et al.* (1987), Garnett (1987), Jollie (1957), Mackay (1988), Marchant & Higgins

(1993), Meville (1980), Osborne (1991), Palliser (1989), Rand & Gilhard (1967), Smith (1992), van Balen (1994), White & Bruce (1986).

## 224 GOLDEN EAGLE

*Aquila chrysaetos* (Linnaeus, 1758)

Plate 79

**DISTRIBUTION** Nearctic, Palearctic and, marginally, Indomalayan (70°N to 20°N), with Afrotropical outposts (south to 7°N); order 6; most widespread *Aquila* eagle, generally not uncommon though locally scarce and, apart from some regional increases or decreases, more or less stable. North America, Eurasia and northern half of Africa: from west and north Alaska across most of mainland Canada to north Quebec and Labrador, in west extending south to Aleutians (Unalaska) and down through western United States (east to western parts of Dakotas, Nebraska, Kansas, Oklahoma and Texas) into Mexico (Baja California south to Vizcaino, and central highlands south to Durango and San Luis Potosí, probably to north Michoacan and Hidalgo, possibly even to Oaxaca), though in eastern USA only single pair in Maine (formerly bred in Appalachians south to east Tennessee); and, in Old World, from northwest and north Europe (Scotland, northwest England, since 1999 also Denmark since 1999), through Fennoscandia, Baltic Republics and Belarus into Russia) and mountains of south Europe (in Iberia, southern France, throughout Alps, Carpathians and Balkans, Italian Apennines, and Mediterranean islands of Corsica, Sardinia, Sicily and Crete), in north extending eastward across northern Asia (north to southern edge of tundra) to Anadyrland and Kamchatka and south to north Kazakhstan, Dzungaria, the Altai, Mongolia, Korea and Japan (Honshu, Kyushu), and in south continuing through Turkey, Middle East (Syria, Lebanon, Israel, Sinai, ?Jordan, Saudi Arabia, ?North Yemen, Oman), Caucasus, and mountains of north Iraq and north, west and southern Iran, on through Afghanistan to north Baluchistan and north Pakistan, thence – apparently avoiding Tibetan plateau – northeast along the Tien Shan into northwest China (north Sinkiang) and southeast through Himalayan foothills east to Arunachal Pradesh and on to

central China (mountains from Sichuan to northwest Heilongjiang); scattered populations in northern Africa (Morocco to northeast Libya, Mauritania, Niger, Chad) and, geographically isolated in sub-Saharan, at 7°N in southern Ethiopia (Balé Mountains, where discovered only in early 1990s).

**MOVEMENTS** Adults mostly sedentary, whereas juveniles disperse various distances (up to c 1000 km) before returning, 2–3 years later, to lead rather nomadic existence generally near natal area. But in extreme northern range, mostly above c 65°N, entire population migratory. Those from north and central Alaska and northwest Canada winter chiefly from south Alaska to west and southwest USA, leaving breeding areas in September and following flyway of western mountains southward along narrow corridors, with marked concentration in southwest Alberta most obvious at Canmore (mean autumn total 6,000, peaking in early October, and daily counts of up to 840+ on northward return in March), and smaller totals in USA (though even as far south as central New Mexico annual spring total of 250+); species also becomes more widespread in north Mexico during winter (especially in southern Baja California and northwest Sonora). Much smaller populations of north-central and eastern Canadian taiga winter in east USA, where sparse records throughout, the easternmost moving down Appalachians and Atlantic seaboard to Tennessee and south to Florida. In Palearctic, north Fennoscandian breeders only partially migratory, some moving 2,000 km southward, but east of there, from Kola peninsula across northernmost Russia to Anadyr, where winter conditions harsher and carrion harder to locate (see Food), whole population shifts southward in August–September, primarily on broad front, to wintering grounds in east and southeast Europe, Russian steppes, Mongolia, northern China and Japan; small



number from northeast Europe, almost all juveniles and immatures, move as far south as north Africa.

**HABITAT** Wide range of essentially open habitats, typically mountainous but also flat, always more or less undisturbed, and ranging from cold north to hot south. In subarctic region breeds at northernmost edge of taiga, adjacent to tundra, foraging over open heathland, and, to south of there, in lowland boreal forest with bogs and other clearings, while in southwest Canada also inhabits almost treeless prairies where low rolling hills interspersed with occasional rivers. But in much of range, in both New and Old Worlds, occupies remote mountain ranges and uplands, often at or above treeline where vegetation short or, sometimes, absent but where adequate crags and cliffs for nesting; then exploit alpine meadows and scree slopes for food. Southern populations inhabit semi-desert and even barren desert with mountains, cliffs and bluffs. Occurs in much same type of habitats in non-breeding season, then extending sparsely into flatter areas such as coastal wetlands. Mostly sea-level to 4,000 m, but to 5,500+ m in Himalayas (and recorded in Nepal to 6,200 m).

**FIELD CHARACTERS** Very big, powerful eagle, brown to blackish-brown with yellowish to tawny or rufous shawl at all ages and, as adult, pale wing-panels, looking massive and thick-necked when perched, with large bill on relatively small head, long wings, comparatively long and slightly rounded or more square-ended tail, long baggy-trousered legs, and big strong feet with exceptionally powerful curved claws 4–6 cm long. Perches horizontally or at times more upright, and often conspicuously, on rock, crag or bare tree branch; surprisingly nimble on ground, where walks confidently and can run quite fast; wings reach or almost reach tail-tip. Sexes hardly distinguishable in field, but female in any one region averages 10% larger (and up to 50% heavier); juvenile and immature distinct; adult plumage not gained until at least sixth year, in some north Eurasian populations not until ninth, though occasionally breeds as subadult.

**PERCHED** Following descriptions, based largely on north European birds of nominate race, apply broadly to other races, too, except that individual and geographical variations can be considerable and some populations may acquire adult or adult-like plumage more quickly (see Geographical Variation). **Adult** Head dark brown apart from crown to hindneck, rear neck-sides and elongated nuchal feathers, which distinctively straw-coloured to golden, tawny or rufous (exact colour varying individually); brown to dark brown above, looking rather patchy owing to mix of paler old feathers and darker new ones with thin pale grey or sandy edgings, and with prominent greyish to buff or tawny panel on wing-coverts (mostly medians, but extent and, moreover, paleness of wing-panel dependent on degree of feather wear), somewhat contrasting greyer-brown remiges with obscure darker bars and broad dark ends, and similarly patterned tail on which base either plain dark greyish (most females) or a shade darker with up to c3 narrower irregular dark bands sometimes visible (most males) inside very broad blackish (sub)terminal; below, more or less uniform dark brown (males on average darker than females) but for somewhat paler thighs and, especially, feathering of legs, though can also have more rufous chest. **Juvenile** Yellow to rufous shawl as adult's

though often duller and browner, but rest of plumage darker chocolate-brown with white feather-bases showing through here and there and wing-covert panels, if visible at all, only obscurely paler rufous-brown (sometimes more obvious on fresh juvenile of southwest Old World race *homyeri*); but, most distinctively, white tail with black subterminal third or so and thin white tip (see also 'Flight'); all dark brown below, too, but for variably whitish to rufous crissum and socks. **Second/fourth-year** Much like juvenile until second autumn, when upperwing-coverts bleached much paler, thus creating more obvious wing-panels in which variable number of much darker new lesser and median coverts, and sometimes few new greater and innermost secondaries, stand out; from third autumn still juvenile-like, though paler, and marked contrasts in wing between fresh darker feathers and heavily abraded pale juvenile ones, as well as some new adult-like dark-ended grey greater coverts and secondaries. **Older immature** From fourth winter on, wing-patches noticeably smaller as median coverts now heavily worn and central greater coverts new, in addition to which shows variable mix of adult and immature flight-feathers (if discernible on perched bird), though white-based tail-feathers normally persist longer and outnumber few adult-like darker rectrices (some immatures at this age, however, almost identical to adult, but may be separable on wing; see 'Flight'). Further moults from fourth summer onwards result in variable prominence of tawny panel on wing-coverts (more uniform and fresh-looking in fifth winter, paler and more worn in sixth), and increasing number of adult-like rectrices with, usually, some dark bars inside broad subterminal. **Subadult** By seventh winter generally impossible to age when perched, unless by presence of some white on tail (see also 'Flight'), and in some populations perhaps already fully adult at this stage; at least in north Europe, however, many probably not adult for further two years, when nine years old. **Bare parts** Adult eyes brown to red-brown, hazel or amber, juvenile dark brown, becoming paler and brighter through immature stages. Cere and feet yellow.

**FLIGHT** Very large, majestic-looking raptor with moderately projecting head and neck, bulging secondaries on long broad wings that are distinctly narrower at base and have narrow-wristed long hands (S-curved trailing edges, most marked on juvenile) with six deeply cut fingers, and long and rather full tail (equal to or longer than wing-base) with gently rounded tip at times looking more squated; wingspan 2.5 times total length. Slow, deep, powerful beats interspersed with brief glides (usually no longer than a second or two) on flattish wings or arms slightly raised and hands level; frequently soars, both high and lower, for long periods, wings slightly forward and in shallow V (occasionally flatter) with splayed primary-tips upcurled; spends long periods patrolling mountain slopes and other open areas, sailing effortlessly without a beat, head often downward while scanning for prey. **Adult** Darkish brown above, back and forewings often mottled with mix of old and new feathers, contrasting with yellowish to golden-buff or rufous crown to hindneck and with dark-spotted greyish to tawny midwing-bands (median and inner greater coverts), while slightly paler grey-brown flight-feathers with c3 indistinct black bars and somewhat bolder broad

trailing edges echoed by greyish tail with or without obscure darker bars merging to broad blackish end-band (most females have unbarred tail with broad terminal, most males slightly darker grey tail with up to three darker bars inside terminal); below, dark brown underbody and wing-linings may show rufous tinge on chest and, especially, lesser coverts, though somewhat darker (pale-mottled) central wing-diagonals usually more obvious against greyer quills that have broad dark trailing edges (any bars on wings and tail rarely noticeable except at closest ranges). **Juvenile** Pale shawl as adult, but otherwise darker brown, even blackish-looking, often with some scattered pale feather-bases visible on body, but most easily distinguished by very prominent and contrasting white on quills, highlighting broad blackish trailing edges (on which narrow white tips soon lost): basal two-thirds or so of tail always white on both surfaces, and often inner bases of remiges, too, but on upperwings white usually restricted to smallish patch on inner primaries or even, not uncommonly, absent altogether; whereas, below, this varies from large patch covering all but tips of primaries, and extending as broad band right across each wing, to reduced white patch or just white streaks on primaries (amount of white in wings individually variable and sometimes, especially on *homeyeri* and American *canadensis*, entirely absent); in addition, below, paler crissum and lower legs occasionally quite striking. **Second/forth-year** Highly variable owing to complex moult: generally like juvenile at first, but upperwing-bands (mostly median coverts) faded and more prominent, and some new feathers appear in wings and tail; following second and third moults, flight-feathers and tail of fourth-year show clear contrasts between very worn old (juvenile) feathers and fresh ones, but general pattern, though paler, still more like juvenile than adult; even so, ageing of third/fourth-years and older immatures made more difficult by wide individual variation in amount of white on quill-bases (which can be lacking altogether from juvenile onward). **Older immature/subadult** From fourth winter on, variable number of narrow-barred grey-brown adult flight-feathers present, and some darker rectrices, too, but white tail-base normally persists longer (even when rest of plumage more adult-like); some older immatures almost inseparable from adult, and frequently so in America (see Geographical Variation), but trailing wing-edges usually more ragged and quills less uniform in age (so more contrasts owing to differences in degree of wear); subadults generally distinguishable only if some white still present at bases of remiges and/or tail.

**CONFUSION SPECIES** In Old World, distinctive silhouette (S-curved wings, long tail), pale crown and nape-shawl, upperwing and tail patterns, and V-held wings when soaring should separate from other *Aquila* eagles, marginally smaller size of which normally impossible to assess in field: only other *Aquila* species to soar on V-wings, also somewhat similar in shape, is Verreaux's Eagle [226] (both flight shape and V greatly exaggerated by comparison, plumage very different); similar-sized, relatively long-winged Imperial Eagle [222] (longer neck more projecting, more parallel-edged wings flatish when soaring, proportionately shorter tail narrower and squarer, adult blacker-looking with better-defined paler shawl, diagnostic white on shoulders/forewing-coverts,

no pale wing-band above, juvenile totally different), as well as both Tawny and Steppe Eagles [220, 221] (again, different shape and wing positions, many plumage differences) and Lesser and Greater Spotted Eagles [218, 219] (differences much as for previous *Aquila*), should not cause serious problems in reasonable views. In north Indian region, Indian Black Eagle [217] easily distinguished (darker, no pale shawl, paddle-shaped wings and different positions). Otherwise, in many parts of Old World range, may need to be distinguished also from immature White-tailed Fish-eagle [48] and, in North America, where Golden the only *Aquila*, from young Bald Eagle [47], but both very different in shape (clearly more projecting heads, broader wings flattish when soaring, former with shorter tail, Bald longer-tailed) and behaviour. Compare also larger Old World vultures [56-66] (generally even bigger, much bulkier, broader-winged, shorter-tailed, level-winged gliding/soaring, many plumage differences). If Golden's large size not immediately apparent, could perhaps be confused by inexperienced observer with some *buteos*, even though those far smaller with different shapes, actions and plumages: compare especially Rough-legged Buzzard [209], juvenile of which has similar tail pattern to young Golden Eagle, and, mainly in southern parts of central Palearctic, dark-morph Long-legged Buzzard [206]).

**VOICE** Remarkably quiet, even when breeding, and voice feeble for bird's size. Main call shrill but thin and puppy-like, variously written as *way-o*, *wah*, *kyek* or *hyo*, singly or repeated rapidly, at times carrying 1.5 km or more but just as often weak and rather pathetic. In aerial display (see Sociosexual Behaviour) series of abrupt, sharp, fox-like yaps sometimes given by pair, and *buteo*-like mewling *toer-o* in mutual high-circling, when may be combined with yelps as *wo-o hyo hyo*. Mew may also serve as alarm, perhaps with other calls: 'rather pathetic-sounding *cheop cheop tyeuk tyeuk*' from bird disturbed at nest, and flushed female gave rapid bubbling *wow-wow-wow* from nearby tree. Other reported calls include fast *kek kek kek* when swooping on prey, shrill *kleeyak kleeyak* by female attacking hare *Lepus*, thin *plook* or *tsuek*, *kiah kiah*, and melodic rattle or trill.

**FOOD** Mainly medium-sized mammals and birds, to lesser extent or, regionally, more commonly reptiles, and occasionally amphibians, fish, even insects (e.g. beetles); much carrion taken, especially in winter. Most prey in size range 0.5-4 kg, mainly to 1.5 kg, but this powerful eagle can carry prey weighing up to 5+ kg. Mammals mainly lagomorphs, marmots and squirrels (*Sciuridae*), and ground-squirrels *Spermophilus*, but ranging in size from small deer and young of sheep and goats, and fox cubs, down to mustelids and voles (*Cricetinae*), and on Swedish island of Gotland (where such animals largely absent) specialises on hedgehogs *Erinaceus*; larger mammals mainly young and/or vulnerable individuals, and include some domestic livestock, but most ungulate food probably eaten as carrion. Avian prey principally grouse (*Tetraonidae*) and pheasants and partridges (*Phasianidae*), locally seabirds, waterfowl and corvids; larger birds also attacked, e.g. swans *Cygnus* and cranes (*Gruidae*), and at other extreme will at times catch and eat smaller open-country passerines such as larks (*Alaudidae*) and pipits *Anthus*. In desert regions especially, but also in Japan, various snakes and lizards can be

important in diet; and in southeast Europe, Turkmenistan and other arid parts of range, tortoises *Testudo* make up large proportion of prey, these carried up in air and then dropped on rocks or other hard substrate below to break shell (cf. bone-breaking behaviour of Lammergeier [53]). Wide variety of carrion, of all sizes, can form substantial part of diet, especially so in winter when other food less abundant or less accessible; indeed, likely that many individuals, especially juveniles, subsist largely on dead animals during at least some periods of year. Frequently scavenges fish in east Asia. Broad dietary overlap with White-tailed Fish-eagle [48] where the two occur together, but Golden Eagle generally less restricted in food preferences. Usually hunts in low quartering flight at slow speed along slopes, making short surprise-pounce on prey or longer rapid dash to secure victim; also watches from high vantage, launching long fast glide ending in powerful stoop, or stoops or glides from high or low soar; more rarely, pounces directly from perch; initial attack followed, if necessary, by tail-chase before grasping animal in talons. Most prey taken on ground, but birds sometimes struck in mid-flight. Variety of more specialised hunting techniques used to catch and kill slower-moving prey, or to overpower ungulates, and may then stalk prey on ground. Not uncommonly hunts in pairs or small groups.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs, and even though at times, especially in America, forms small loose groups on passage or at winter roosts, or occasionally when hunting, never really sociable; solitary and monogamous breeder, too, but trios recorded very rarely. Aerial displays conspicuous, often with calling, and single or, commonly, mutual high-circling frequent throughout year: after quickly soaring upwards, often to great height, eagle enters slow flat glide that continues for some distance until next updraught or thermal enables renewed upward spiralling. High soar often followed by spectacular undulating display, by one or both of pair, most frequent in months just before nesting but performed at any time of year: from level flight bird enters steep dive on half-closed wings for tens of metres before swinging sharply up again, with few strong flaps at peak of climb, then plunging once more, repeating process up to 20 times across sky. Territory-owners dive at and pursue intruding eagles of own and other species, latter sometimes rolling over to present talons; true cartwheeling, with two birds locking claws together high in air and spiralling earthwards, evidently involves resident eagle and intruder, but seemingly rare in occurrence, especially in Old World, and certainly far less frequent in all *Aquila* eagles than in *Haliaeetus* fish-eagles [42–49].

**BREEDING** March–August in most of range, but from December/January in southernmost parts (e.g. Israel, Oman, Indian region, south USA), possibly from late November in Ethiopia, and, from end April–May in far north. Huge stick nest, up to 1.5 m across and 1 m deep, with repeated use bigger (to 2 m in each direction, and depth of 6 m recorded), sparsely lined with wool, grass and leaves, and much greenery added during incubation and nestling periods; generally high on inaccessible cliff ledge or crag, less often in large tree or (as in e.g. India) in smaller one growing out of cliff; but, where suitable

cliff sites lacking, more frequently in tree, and regionally (e.g. lowlands east of Baltic Sea) exclusively so, then usually conifer, but commonly broadleaf where such more abundant (as in northeast Wyoming, USA), or occasionally on pylon or similar artificial structure, rarely on ground. Clutch 2 (1–3, exceptionally 4). Incubation 41–45 days (earlier reports of 28–35 days in USA erroneous). Fledging 70–80 days (60–85); dependence 2.5–4+ months, in part linked with ease of access to food, especially carrion.

**POPULATION** Following heavy persecution in earlier times that led to widespread declines in 19th century, has since recovered more or less everywhere; disappearance from Appalachians of eastern USA a result of loss of open ground needed for hunting as natural woodland recovered from effects of widespread burning and other clearance. Now, through vast range across northern hemisphere, varies from being rather common, at least locally (e.g. in Himalayas and parts of Rockies), to scarce or rare (e.g. southern parts of Old World range). In North America, where this species appears to be thriving, relatively few reliable estimates for individual states range from c3,380 pairs in Wyoming down to 500 pairs in California, from which J. Watson calculated a total New World population of 20,000–25,000 pairs; judging from winter counts of 63,000 individuals in 1980s, since when there has been evidence of a slight increase overall, this figure seems quite likely. Well-studied European population estimated to number 5,000–6,000 pairs in mid 1990s, with majority in Scandinavia (700–1,000 Norway, 600 Sweden) and Spain (c1,200), and important subpopulations in Scotland (420), Italy (300–400, c50 of which in Sardinia and Sicily), France (c250, plus c30 in Corsica), Austria and Switzerland (each 200–250), and Finland (220), while European part of Russia considered to hold some 200–400 pairs; interestingly, Watson analysed the European population by biogeographic region, too, giving resultant figures of 1,880 pairs in the northwest mountains (Scotland, Fennoscandia), 810 in the lowlands east of the Baltic, 1,470 in the west Mediterranean mountains (Iberia east to Italy), 840 in Alps and Pyrenees combined, and 600 pairs in the Balkan mountains. Elsewhere in Palearctic, few hundreds of pairs estimated to breed in north Africa (most in Morocco) and probably slightly more in Turkey, 220 pairs in the Caucasus, 40+ pairs in Israel and smaller numbers in other Middle Eastern countries, but, apart from c120 pairs (350–500 individuals) in Japan, very few accurate population estimates available from remainder of huge Asian range, which must cover in excess of 15 million km<sup>2</sup>; typical densities in Europe and North America of 1–2 pairs/100 km<sup>2</sup> would, by extrapolation, give minimum figure of around 15,000 pairs in Asia, but, considering that this eagle appears not uncommon in much of that vast region, and comparing an American population of 20,000+ breeding pairs in perhaps some 12 million km<sup>2</sup>, true figure is almost certainly higher than that and, with abundance of suitable habitat there, could even be twice as high. Conservative world total of 50,000 pairs seems certainly too low, and 75,000 a more reasonable figure, while 100,000 thought not impossible; with addition of non-breeders, which vary regionally from 15% to 50% of breeding numbers, global population must be at least

120,000 individuals and, far more likely, somewhere in region of 250,000. Where general trends are known, Golden Eagles seem to be stable or increasing, though notable declines recorded in several areas, particularly along south Californian coast and, in Europe, in southeast and in lowlands east of Baltic, as a result of loss of specialised habitat and, mainly in southeast Europe, human disturbance and/or persecution. Poison baits, collisions with powerlines and shooting still cause some mortality locally, but appear not to be having any appreciable effect on populations as a whole.

**GEOGRAPHICAL VARIATION** Five or six races normally recognised, though geographical variation not great and, in Old World, largely clinal in size (increases west to east, decreases north to south in Asia). Further, colour of shawl, formerly considered racial character, is in fact subject to considerable individual variation (from pale straw to deep/bright rufous), and, similarly, amount of white in wings (and, to lesser extent, tail) of juveniles and immatures also varies; such factors, along with similar variation in general coloration caused largely by effects of plumage wear, make assessment of any geographical differences difficult. This needs to be borne in mind when interpreting the following descriptions of races. In addition, nominate race intergrades with darker population in Siberia and Altai that has been variously treated as separate race (*kamtshatica*) or merged with North American *canadensis*; those two appear identical in all respects apart from size.

*A. c. chrysaetos* (Europe, except southwest, eastward in Russia to Yenisey river) Medium-sized; generally palest, elongated nape-feathers longest and usually golden.

*A. c. homeyeri* (Iberian Peninsula, north Africa and Crete east through Middle East and Arabian Peninsula to Caucasus and Iran; presumably this race in Ethiopia) Smaller; generally darker plumage, crown and nape browner.

*A. c. daphanea* (east Iran through Himalayan region to western and central China) Largest on average; darker than preceding two races, elongated nape-feathers intermediate in colour between those two.

*A. c. japonica* (Japan, Korea) Smallest; feet relatively less powerful; averages darker, more blackish, than all preceding races, nape-feathers bright rufous, often much white mottling on inner webs of tail-feathers.

*A. c. canadensis* (North America, and northeast Asia from about central Siberia and Altai to Kamchatka and northeast Russia) Size similar to or smaller than nominate in North America, but much bigger in northeast Asia; dark, blackish-brown plumage, crown dark

brown, nape-feathers generally brighter rufous to rufous-brown/orange and only slightly narrower/shorter than nominate. (At least in North America, appears to replace greater number of feathers in each pre-adult moult, so that adult plumage acquired earlier than in north Europe, in around sixth year.)

**MEASUREMENTS** *A. c. chrysaetos* ♂ wing 565–670 mm, ♀ 613–712 mm; ♂ tail 285–386 mm, ♀ 310–378 mm; ♂ tarsus 94–115 mm, ♀ 97–122 mm. *A. c. homeyeri* ♂ wing 550–615 mm, ♀ 600–705 mm. *A. c. daphanea* ♂ wing 600–680 mm, ♀ 660–720 mm. *A. c. japonica* ♂ wing 580–595 mm, ♀ 630–655 mm. *A. c. canadensis* ♂ wing 591–640 mm, ♀ 601–673 mm; ♂ tail 267–310 mm, ♀ 290–330 mm (*'kamtshatica'* ♂ wing 620–655 mm, ♀ 660–720 mm). **Weights** *A. c. chrysaetos* ♂ 2.8–4.6 kg, ♀ 3.8–6.7 kg. *A. c. homeyeri* ♂♀ 2.9–6.0 kg. *A. c. daphanea* ♂ 4–4.1 kg (two), ♀ 6.4 kg (one). *A. c. canadensis* ♂ 3.0–4.3 kg, ♀ 3.6–6.4 kg.

**REFERENCES** Ali & Ripley (1978), Amadon & Bull (1988), Arroyo *et al.* (1990a), Beaman & Madge (1998), Berge (1987, 1990), Bernis (1974a/b), Besson (1967), Bezzel & Fünfstück (1994), Boeker & Ray (1971), Bortolotti (1984), Bratislav (1988), Brazil (1991), Brazil & Hanawa (1991), Brown (1976b/c), Brown & Watson (1964), Brown *et al.* (1982), Calderón *et al.* (1977), Camenzind (1969), Castano Lopez & Guzman Peña (1995), Cheng Tso-hsin (1987), Cheylan (1973), Clark & Schmitt (1999), Clark & Wheeler (1987), Clouet (1981), Clouet & Barrau (1993), Clouet & Goar (1981, 1984), Collopy (1980, 1984, 1986), Collopy & Edwards (1989), Corkhill (1980), Craig & Craig (1984), Cramp & Simmons (1980), Delibes *et al.* (1975a/b), Dementiev & Gladkov (1951), Dennis *et al.* (1984), Deppe (1974), Dixon (1937), Ellis (1979), Estève & Matérac (1987), Etchécopar & Hùe (1978), Fasce & Fasce (1984), Fernández (1988, 1991), Fernández & Leon (1985), Fevold & Craighead (1958), Flint *et al.* (1984), Forsman (1999), Gønsbøl (1986, 1993), Gjershaug (1996), Glutz von Blotzheim *et al.* (1971), Gordon (1955), Grimmett *et al.* (1998), Grubac (1988), Hagemeyer & Blair (1997), Haller (1982, 1994), Halley (1998), Halley & Gjershaug (1998), Handrinos & Akriotis (1997), Högström & Wiss (1992), Howell & Webb (1995), Inskipp & Inskipp (1991), Jenny (1992), Jollie (1947), Jordano (1981), Knight (1927), Król (1983), Marquis *et al.* (1985), McCahan (1968), McGrady (1997), Menkens & Anderson (1987), Michel (1987), Millsap & Vana (1984), Morneau *et al.* (1994), Murphy (1974), Novelletto & Petretti (1980), Olendorff (1975), Palmer (1988), Porter *et al.* (1981, 1996), Randler (1994), Richardson (1990), Roberts (1991), Rogacheva (1992), Sherrington (1993), Shirihai (1996), Shirihai *et al.* (1996), Snyder & Snyder (1991), Snyder & Wylie (1976), Sulkava *et al.* (1984), Svensson *et al.* (1999), Tjernberg (1981, 1983a/b, 1985, 1988, 1990), Vozeley (1996), Walker (1987), Watson *et al.* (1989), Watson (1992a/c, 1997), Watson & Dennis (1992), Watson & Langslow (1989), Watson *et al.* (1992a/b, 1993), Wheeler & Clark (1995), Zastrow (1946).

## 225 WEDGE-TAILED EAGLE *Aquila audax* (Latham, 1801)

Plate 78

Other names: Eaglehawk, Mountain Eagle

**DISTRIBUTION** Australasian (8°S to 44°S); order 6; widespread, and scarce to locally common. Endemic to Australia and south-central New Guinea; extreme southeast Irian Jaya (east of Kurik), southwest Papua New Guinea (west of Oriomo), and throughout much of

Australia including Tasmania and such larger offshore islands as Great Sandy, Flinders, Kangaroo, Melville and Groote Eylandt. Though most confirmation of breeding has come from the east and southeastern third and the southwest, the greatest numbers are apparently in the west, central and south arid regions.

meat less palatable); spiny echidna *Tachyglaxus* also recorded. Carrion important, but mainly outside breeding season, when groups of 5–12, once over 20, of these eagles, particularly immatures, may congregate at dead cattle, deer or other larger carcasses. Lizards include goannas and bearded dragons; and birds especially crows and cockatoos, occasionally larger species such as ibises, herons, ducks and bustards. Almost all prey taken on ground, or to lesser extent from tree canopy, and usually by pounce or snatch during glide or tail-chase from low quartering or transect flight; occasionally still-hunts from perch; sometimes pulls possums *Trichosurus* and other mammals from tree cavities, also young birds from nests, and on occasion pirates food from other predators. Can carry prey up to at least 5 kg. Large animals may be attacked by pairs or groups acting co-operatively; one record of 15 hunting a Red Kangaroo *Macropus rufus*, two at a time actively chasing and then repeatedly being replaced by two more from circling group overhead.

**SOCIOSEXUAL BEHAVIOUR** Adults usually solitary or in pairs, but immatures more gregarious: 10–15 may rest or soar together, and up to 40 recorded at carcasses. Aerial displays include high-circling by one or both of pair, sometimes interspersed with flight-roll and talon-presenting, or steep dive on part-closed wings followed by upward swoop; latter may continue into spectacular undulating sky-dance. Cartwheeling said to be rare; but, in one observation of three immatures mock-diving at each other, two birds interlocked talons and cartwheeled several times before breaking away. Aggressive towards hang-gliders and aircraft: advances noisily, bill open and talons extended, until flying just above and behind (occasionally slightly ahead of) pilot, then swoops repeatedly, often making contact with hang-glider.

**BREEDING** (April) July–December throughout most of range, and in New Guinea apparently from about May; but in northernmost Australia laying recorded in January and February, and in Tasmania in September; in western Australia breeding depends on availability of food, and during drought periods there may be no nesting for up to four years. Nest is usually substantial and often massive structure of sticks, perhaps only 1 m across and 75 cm deep when new but, after repeated use over years, sometimes 2.5 m across and nearly 4 m

deep, lined with green leaves and twigs; ideally at 12–30 m on lateral branch of lone or forest tree, and in taller tree can be even as high as 73 m, but may be in much lower growth or even on rocks or ground where trees scarce. Clutch 1–2 (1–4). Incubation 42–48 days. Fledging 70–95 days, with dependence for up to 6 months.

**POPULATION** Several reported densities of 3–6 pairs/100 km<sup>2</sup>, and others of 7–21 pairs/1,000 km<sup>2</sup>; and, when rabbits in plague numbers, two nests 700 m apart and each of four others separated by no more than 2 km from the next. Even though often much scarcer than these figures may suggest, total potential breeding distribution covers nearly 7 million km<sup>2</sup> and population seems likely to be in hundreds of thousands. Forest clearance and, particularly, rabbit introduction must have benefited this species, which, in general, is probably commoner now than before colonisation by Europeans. Though protected, sometimes shot, trapped or killed by poisoned carcasses put out by farmers, who regard it as serious sheep-predator. Tasmanian race (*fleayi*), with small range and more specific habitat requirements, now considered endangered: 140 pairs in 1980s had declined to only 60–80 by mid 1990s.

**GEOGRAPHICAL VARIATION** Two races usually recognised; no constant difference in size, though birds from cooler regions tend to be somewhat larger and heavier.

*A. a. audax* (Australia, New Guinea) As above.

*A. a. fleayi* (Tasmania) Differs in whitish-buff, rather than tawny-rufous, nape.

**MEASUREMENTS** ♂ wing 553–667 mm, ♀ 600–703 mm; ♂ tail 352–479 mm, ♀ 376–482 mm; ♂♀ tarsus 99–120 mm. **Weights** *A. a. audax* ♂ 2.03–4.0 kg, ♀ 3.05–5.3 kg; *A. a. fleayi* ♂ 3.68 kg (one), juvenile ♂ 4.03 kg (one).

**REFERENCES** Baker-Gabb (1984b), Beechler *et al.* (1986), Blakers *et al.* (1984), Brooker (1974, 1983), Brooker & Ridpath (1980), Coates (1985), Cupper & Cupper (1981), Eddy (1959), Fleay (1952), Garnett (1992), Hollands (1984), Hoogerwerf (1964), Hughes & Hughes (1984), Hull (1986), Leopold & Wolfe (1970), Marchant & Higgins (1993), Meredith (1990a/b), Morris (1976b), Olsen & Marples (1992, 1993), Olsen *et al.* (1993a), Pizzey (1958), Price-Jones (1983), Ragless (1995), Ridpath & Brooker (1986a/b, 1987), Robertson (1987), Schodde & Tidemann (1988), Woodland (1988), Young (1973).

## 226 VERREAUX'S EAGLE

*Aquila verreauxii* Lesson, 1830

Plate 82

Other name: (African) Black Eagle

**DISTRIBUTION** Afrotropical and marginally Palearctic (30°N to 35°S); order 5; despite wide range, always local with precise habitat requirements (closely linked with distribution of rock hyraxes; see Food) and, though sometimes reasonably common, often uncommon or rare. East to South Africa, also Central Africa and, very locally, Middle East; main range extends from northeast Sudan and northwest Somalia through Ethiopia, northeast Uganda, Kenya, eastern DR Congo and, very locally, Tanzania, into Malawi, Zambia, Zimbabwe,

Swaziland, Lesotho and South Africa, and thence up into western Namibia and southwest Angola; also borders of Central African Republic, Sudan and Chad north to Ennedi; and western Yemen (perhaps into southwest Saudi Arabia), southwest Oman, southeast Egypt, Sinai, possibly still Israel and now southwest Jordan (where one or two adults seen since mid 1980s).

**MOVEMENTS** Adults strictly sedentary and, though juveniles and immatures dispersive, no evidence of their moving great distances. Although nesting attempts in 1960s in Israel's Upper Galilee and Judea were thought

in order, were rock hyrax *Procavia capensis*, Smith's red rockhare *Pronolagus rupestris*, grey meerkat *Suricata suricatta*, mountain reedbuck *Redunca fulvorufula*, goats/sheep, scrub hare *Lepus saxatilis*, Cape Francolin *Francoelinus capensis*, Helmeted Guineafowl *Numida meleagris*, yellow mongoose *Cynictis penicillata*, and angulate tortoise *Chersina angulata*. Though quite frequently stooping at prey from soaring flight, and often foraging by low-level quartering, relies to considerable extent on surprise attack after approach behind cover of ridges or rocks: indeed, this may lead to pair hunting co-operatively, one flying past and distracting hyrax colony while other then strikes from behind. Recorded knocking hyraxes off cliffs, and taking arboreal mammals from tree tops, but most prey caught on ground. Sometimes still-hunts from tree or rock perch, stooping with half-closed wings, but, while this may often be opportunistic, still-hunting by direct stoop from perch used by 14 of 15 individuals in one study. Recorded pirating Martial Eagle [248] and Lammergeier [53] of hyrax and carrion respectively.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Aerial displays throughout much of year, often involving pair together and sometimes highly spectacular, but usually silent (see Voice). Pair frequently circles or makes figure-of-eight over territory, male often higher; he may dive at female (or vice versa), sometimes repeatedly, and she may roll over and present claws; or he may soar close behind her with exaggeratedly upcurved wings. Undulating sky-dances involve steep dives on closed wings and upward flapping swoops on spread wings (exposing white back), sometimes with somersault and half-roll at peak of each ascent. These displays may also be directed at intruder, and such encounters may involve talon-grappling and tumbling and spiralling descent.

**BREEDING** December–August (?) in Sudan and Arabia, October–May in Ethiopia and Somalia, year-round in East Africa (peak May–December), and April–November in Zambia southwards. Nest is large flattish stick structure, up to 1.8 m across and sometimes 2 m deep

(once 4.1 m deep) after re-use over several years, lined with green leaves; usually on cliff, often under overhang or in small cave, sometimes on open ledge; rarely in euphorbia, acacia or other mountain tree, or even on radio tower. Clutch 2 (1–3). Incubation 43–47 days. Fledging 84–99 days.

**POPULATION** In one area of Zimbabwe, 60 pairs in 620 km<sup>2</sup> gave average density of 1 pair/10.3 km<sup>2</sup>, but this is exceptional; optimum in East Africa 25 km<sup>2</sup>, while in South Africa, despite local densities of 10.4 km<sup>2</sup> and 14–15 km<sup>2</sup>, often nearer 60 km<sup>2</sup>. Moreover, considerable areas of total range of over 4 million km<sup>2</sup> unsuitable habitat, so total population seems unlikely to exceed upper tens of thousands. Although locally persecuted, lives generally in non-vulnerable habitat and, not taking much carrion, at little risk from poisoned carcasses; numbers probably stable, but plentiful supply of hyraxes essential and, where these hunted for food and skins, populations have shown marked declines. In eastern South Africa, 78 pairs in 1980 (25 in reserves) reduced to 27 in 1988 (19 in reserves).

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 565–595 mm, ♀ 590–640 mm; ♂♀ tail 272–318 mm, tarsus 95–110 mm. **Weights** ♂ 3.0–4.15 kg, ♀ 3.1–5.8 kg.

**REFERENCES** Allan (1988a), Benson & Benson (1975), Boshoff & Palmer (1988), Boshoff *et al.* (1991), Britton (1980), Brown (1988a), Brown & Cooper (1987), Brown (1952, 1953, 1955, 1966, 1970a, 1974c, 1976b), Brown *et al.* (1978, 1982), Cottrell (1970), Cramp & Simmons (1980), Dick & Fenton (1979), Eichacker (1990), Gargett (1970, 1971, 1972, 1975, 1977a/b, 1978a/b, 1984, 1990), Gargett & Gargett (1993), Gensbol (1986, 1995), Ginn *et al.* (1989), Goodinan *et al.* (1989), Jenkins (1984), Lewis & Pomeroi (1989), Ludwig (1974), Mackworth-Praed & Grant (1957–73), Maclean (1993), Marx & van Staden (1989), McCrea (1977), Mendelssohn (1971), Perrett (1976), Pickford *et al.* (1989), Pinto (1983), Pitman (1960), Pringle (1959), Rowe (1947), Scotcher (1975), Shirihai (1996), Siegfried (1963, 1968a), Steyn (1974, 1982), Tarboton & Allan (1984), Vernon (1965), Visser (1965), Zimmerman *et al.* (1996).

## Accipitridae (t: hawk eagles)

### 227 BONELLI'S EAGLE

*Hieraetus fasciatus* (Vieillot, 1822)

Plate 83

**DISTRIBUTION** Palearctic, Indomalayan and marginally Afrotropical (45°N to 10°S); order 5; local and uncommon, mostly scarce to rare, and generally declining. Fragmented distribution in northwest Africa, southern Europe, Middle East and southern Asia, and Indonesia: from Anti-Atlas in Morocco northeastward through lower parts of Atlas Mountains to north Tunisia, north Libya (status uncertain, but has bred in northwest and northeast), and southern Europe from Portugal, Spain, south France, Italy (Sardinia, Sicily) and Croatia to Greece, Crete, west and south (northeast?) Turkey, Syria(?), Cyprus, Israel, west Jordan, northeast Egypt (northern half of Sinai, rare), western and southern

parts of Arabian Peninsula around to United Arab Emirates, and east Iraq and west, south and northeast Iran, extending just into Turkmenistan in Kopet Dag range, east Afghanistan and Pakistan through most of Indian subcontinent (generally uncommon throughout, locally more common Nepal, absent east India, only vagrant Bangladesh and Sri Lanka), and from central Burma across northwest Thailand and north Laos (status in last two uncertain, very few confirmed records, perhaps only visitor) and south China (Yunnan, Guangxi and Guangdong north to Yangtze river); isolated Indonesian population in Lesser Sundas (Sumbawa, Timor, Wetar, Luang, probably also Flores).

and grey tail with obscure thin bars and prominent broad blackish subterminal; below, whitish body with variable chest-streaks, white lesser coverts and dark-ended pale grey tail stand out against blackish central wing-band (median and greater coverts), this further contrasted by only faintly and thinly barred light grey-brown flight-feathers with paler bases, especially on primaries, and rather obscure broad dark trailing edges and wing-tips; in front view, whitish leading wing-coverts often obvious. **Juvenile** Brown above, with or without creamy patch on back and obscure narrow U above barred tail, and with slightly darker wing-ends and tips to greater coverts and greyer primary-windows; head darker around eyes and on ear-coverts, or rarely all grey; below, wing-linings light rufous to warm buff like body (chest indistinctly streaked) and usually with darker tips to greater coverts forming wing-diagonal (sometimes lacking, or confined to carpal area), against thinly dark-barred light greyish tail and wing-quills with whiter primary bases and conspicuous blackish wing-tips. **Immature** Gradually acquires adult plumage over four to five years: appearance closer to juvenile until about third winter, by when more streaky below and with dark centres to greater underwing-coverts; thereafter more adult-like, with fairly prominent underwing-diagonals, broader subterminal tail-band, and whiter and more streaked underbody, but still mix of barred paler juvenile and plainer darker adult flight-feathers.

**CONFUSION SPECIES** In good view, combination of shape, plumage and flight makes both adult and juvenile unmistakable. In poor view or at distance, adult possibly confusable with extremely variable honey-buzzards [18, 19] (somewhat similar in shape and proportions and, to certain extent, at times also plumage pattern, but much smaller, slimmer-headed, with boldly barred tail and underwings, broad dark trailing wing-edges, no pale mantle patch or dark underwing-diagonals); or perhaps with Northern Goshawk [153] (shorter wings with less full hands, slightly longer tail, some flight differences, many plumage distinctions), while distant juvenile could be mistaken for sandy-rufous morph of Long-legged Buzzard [206] (smaller, shorter-tailed, with prominent dark carpals and trailing edges, V-held wings when soaring). In southern part of Red Sea, possible wanderers (juveniles the more likely) need to be separated from closely related African Hawk Eagle [228]: see that species (comparatively shorter-winged and longer-tailed, adult with more contrasted plumage, juvenile darker above with pale wing-windows).

**VOICE** Less well studied than that of African Hawk Eagle [228], though similarly rather silent except during breeding season. Main call in courtship display and at nest a loud shrill *yuii-yuii-gii-gii* or drawn-out *heeeei-heeeei*, with slight variations, given by both sexes, more intensely by female on approach of male with prey. Also fluted low-pitched *klu-klu-klu...*, repeated *ki ki ki...* in alarm, and other barking, gurgling and grunting sounds at or near nest.

**FOOD** Small and medium-sized birds, mammals, some lizards, occasionally insects; rarely carrion. On average takes smaller prey than African Hawk Eagle [228]. Diet well adapted to availability: in southwest Europe, during August–April, birds c80% of prey, mainly partridges

*Alectoris* but also Jackdaws *Corvus monedula* and other crows, and including larks, pigeons, rails, gulls, ducks, on occasion even other birds of prey and species to size of herons and storks; in May–July, mammals predominate, mostly rabbits (whose numbers increase hugely at this time), but also hares and small rodents (squirrels, rats); lizards commonly caught when abundant. Similar prey taken in rest of range, gamebirds most commonly, and large species again unusual but to size of Greylag Goose *Anser anser*, storks and Houbara Bustard *Chlamydotis undulata*, while domestic poultry and doves exploited in India; mammals to size of fox reported. Frequently forages along same route for many weeks, being seen daily at same places. Hunting methods recall powerful accipiter. Commonly still-hunts, often from concealed tree perch, dashing out to snatch birds as they take off, at times making lengthy tail-chases that may continue between or into trees or bushes. Also quarters ground or patrols hillsides, not uncommonly as pair with one almost directly above the other; and co-operative hunting recorded in which one eagle scattered a flock of birds to isolate a selected individual, which was then grabbed by its mate; will also stoop on prey from soaring flight. Most birds taken on or just above ground, but some snatched from bushes or, rarely, from water, and others in active flight; observed chasing and flying beneath a Jackdaw before swooping upwards and grabbing it. Occasionally walks on ground after prey.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, often, in pairs. Aerial displays, with some calling, include single or mutual high-circling and, commonly, sky-dancing in area of eyrie, in which one or other plunges headlong from great height, wings almost closed, before checking and then rising on stiff wings, circling to regain original altitude and diving again, repeating sequence up to 5–10 times. Occasional talon-grappling reported, but not apparently regular and probably more likely to involve a territory holder and an intruding Bonelli's Eagle. May attack also other large raptor species near nest.

**BREEDING** Late January/February–July in west and November–August/September (mainly December–May) in Indian subcontinent and Burma, but present at eyrie for 2–3 months beforehand. Nest is huge structure of branches and sticks, up to 1.8 m across and 60 cm deep but with repeated use up to 2 m in both directions, lined with little greenery, high on cliff ledge or at 5–40 m (usually above 10 m) in large tree, rarely on building; same nest used in successive years, or several different ones within territory used in turn. Clutch 2 (1–3). Incubation 37–41 days. Fledging 55–65 (rarely 70) days, with dependence for 8+ weeks.

**POPULATION** West Palearctic population recently estimated at 2,000–3,000 pairs, with Iberia (750–845) and northwest Africa (1,000+) the core areas; mid-1990s data indicate 938–1,039 pairs in all Europe, some 80% of these in Spain, with only small numbers in six other countries (75–90 in Portugal, 35–45 in Greece, 29 in France, 15–20 in Italy, handful in each of Croatia and Albania), and maximum of 100 pairs in Turkey. In Israel 28 pairs known (26 breeding) in 1989, but inadequate information from rest of Middle East, and from Asia, where reportedly widespread but mainly scarce or uncommon. Throughout entire range, species has

wing-tips short of terminal tail-band. Sexes rather similar, female averaging 5% larger and possibly 20% heavier; juvenile distinct; not fully adult until fourth year. **PERCHED Adult** At distance looks black above and white below. At closer ranges, blackish upperparts show some white flecks on mantle and wing-coverts, greyer patch on folded secondaries, and grey tail with thin dark bars, broad subterminal band and white tip; below, bold drop-like streaks rather sparse on male, denser on female, but thighs and crissum plain white. **Juvenile** Dark brown above, with some paler edgings, black-streaked head, and evenly and more clearly barred tail; all rufous below, becoming paler rufous-buff on thighs and legs, with black shaft-streaks only at sides of chest. **Immature** During second to fourth years, immature stages progressively darker above, with broadening subterminal tail-band, and paler and more streaked below. **Bare parts** Adult eyes rich yellow, juvenile hazel. Cere and feet greenish-yellow to yellow.

**FLIGHT** Mid-sized raptor, small and well-protruding head combining with longish tail and not particularly long or broad wings to give something of shape of Western Honey-buzzard [18], and size similar; wingspan 2.4 times total length. Powerful shallow beats; glides and soars on flat wings well spread, carpal joints pressed only slightly forward in glide. Pair frequently soars together. **Adult** Black above, with pale greyish windows at bases of primaries extending into dark grey panels across black-tipped secondaries; comparable pattern on obscurely barred grey tail with broad black subterminal band; black trailing edges and subterminal band more prominent from below, where contrasted by greyish-white flight-feathers and tail-base, the underbody white with black streaks, but black-mottled wing-linings coalescing into variable solid black diagonal across greater coverts even more dominant feature. **Juvenile** Brown above with contrasting creamy windows and barred tail; below, wing-linings rufous like forebody and rather variably dusky-edged (at least forming carpal arcs and sometimes continuing as wing-diagonals), but otherwise rather nondescript with greyish-buff secondaries and tail thinly barred, and whiter-based primaries.

**CONFUSION SPECIES** Needs to be distinguished from related Bonelli's Eagle [227] on either side of southern Red Sea: Bonelli's larger and relatively broader-headed, longer-winged and shorter-tailed; browner adult usually with white mantle-patch but no pale wing-panels above, and less contrastingly marked below; juvenile paler-backed and with less clear windows. Adult otherwise unlikely to be mistaken, but closest is perhaps Ayres's Hawk Eagle [232]: generally smaller, stockier, rounder-headed and with slight crest; no windows above; more evenly blotched or streaked all over underbody, wing-linings and legs; more heavily barred on quills and lacking heavy black trailing wing-edges and subterminal tail-band; juvenile Ayres's can be similar in flight from below, if usually paler rufous with darker quills, but much paler above, with whitish scaling and rufous crown and mantle; moreover, in all plumages Ayres's shows white 'landing lights' in flight like Booted Eagle [230]. Despite comparison, under 'Flight', of shape with that of Western Honey-buzzard [18], wing actions and patterning quite different, and confusion unlikely. Consider also much larger Crowned Hawk Eagle [246] and, in case of juvenile, Great Sparrowhawk [151] too.

**VOICE** Usually silent outside breeding season. Then main call melodious fluting *kloee* used in contact between pair-members, and repeated or developed into *klu-klu-klu-kloee*, with variations, in both courtship and aggression. Other calls at or near nest include repeated loud *kweoo* or *ko-ko-ko-kweoo* and squealing *skweya*, as well as various squawks, clucks and softer notes.

**FOOD** Large birds, mammals, occasionally insects; occasionally lizards and snakes; rarely carrion. Strong and fierce hunter that kills some prey much heavier than itself: large ground-feeding birds (francolins *Francoelinus*, guineafowl, smaller bustards, hornbills) and medium-sized mammals (to size of dikdik, mongoose, hare, young hyrax) in range 300 g–4 kg, or from one-third to three times own weight. May prey on colonial nests of queleas and herons. Chickens sometimes taken in cultivated areas. At least juveniles will eat insects. Carrion-feeding rare, but one pair returned to dead reedbuck over three days. Sneaky foraging techniques recall huge accipiter. Mostly still-hunts, with low-level dash from perch in cover: often waits near waterholes and among riverine trees for drinking doves and sandgrouse, or by clearings that birds frequently cross; one pair regularly preyed on roost of fruit-bats. But also makes surprise-flights low among trees or behind cover and, at least occasionally, stoops to ground while soaring. Pair often hunts together and, in these circumstances, some indications of deliberate co-operation, one distracting and the other striking. Most birds taken on ground or while alighting or taking off, but some snatched in flight and others pursued into vegetation.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, more frequently, in pairs. Aerial displays often involve little more than mutual circling, with intermittent calling, but male sometimes sky-dances in relatively shallow undulations with steep plunges and short rises with little wing-flapping, or stoops at female, who rolls and presents claws. Often very aggressive towards other larger raptors, and will sometimes strike human intruders at nest.

**BREEDING** October–March to north of equator in East Africa, and April–January (especially June–October) farther south down to Botswana and northeastern South Africa; February–June in Gambia. Nest is very substantial structure of large sticks, commonly up to 1 m across and 50–80 cm deep and sometimes more, even up to 1.25 m deep, lined with green leaves; usually in main fork or well out on lateral branch at 4–36 m (generally 9–15 m) in acacia, baobab, eucalyptus or other tall tree, often along watercourse; in East Africa rarely at base of bush on cliff ledge and, in southern Africa, recently on pylons. Clutch 2 (1–3). Incubation 42–44 days. Fledging 61–71 days.

**POPULATION** Despite wide range of some 10 million km<sup>2</sup> in sub-Saharan Africa, often exceedingly scarce and patchy. Though densities of 1 pair/12–30 km<sup>2</sup> have been recorded, 55–110 km<sup>2</sup> are more usual and large areas have little suitable habitat or too high rainfall. Former Transvaal, in northeastern South Africa, held estimated 1,600 pairs at overall average density of 1 pair/170 km<sup>2</sup>, on which basis the total population could be well in six figures, but is probably safer to assume that it lies somewhere between the upper tens and lower hundreds of thousands. No evidence of decline in southern Africa, but thought to be decreasing elsewhere, particularly in

head or abdomen. **Pale-morph adult** (scarce to rare) Largely white but for cream-edged grey-brown wing-coverts, scapulars and back, and blackish flight-feathers and tail; variable blackish shaft-streaks on crown, chest-sides, and elsewhere. **Intermediate adult** Almost any shade of paler brown, including yellow-brown and slightly rufous-tinged, or mixture: pale brown birds may have dark head, or dark brown birds paler crown or white head and sometimes pale abdomen. **Juvenile** Indistinguishable from adult, apart from tendencies to broader pale edges on wing-coverts and more numerous blackish shaft-streaks on head and neck; but, considering plumage variation and effects of wear, reliably identifiable only when first out of nest (older birds then in worn plumage). **Bare parts** Eyes dark brown, cere and feet yellow.

**FLIGHT** Mid-sized raptor, little larger than Black Kite [39], with long wings and longish square-tipped tail; wingspan 2.5 times total length. In view of polymorphic plumage - usually uniformly brown, sometimes largely white or part-coloured - characteristic shape all-important and this often likened to two planks, one narrow and the other broader, crossed at right-angles: on the one hand, slim projecting head, slender body, and square-tailed tail usually held closed; and, on the other, relatively narrow wings often held straight out with parallel edges, and lingering not prominent. Fast and rather

shallow beats; otherwise wings flat, angled forward in glide and straight out when soaring. **Plumages** From above, may look uniformly dark brown (dark morph), or body and wing-coverts paler than flight-feathers and tail (intermediate), or head and mantle almost plain white against dark back, wings and tail (pale morph), or rarely mosaic of these colours (see above). From below, head, body and wing-linings usually uniformly dark to pale brown or, sometimes, white; undersides of flight-feathers and tail always grey, obscurely darker-tipped and thinly barred, with slightly paler bases to primaries. (See also fig. 50.)

**CONFUSION SPECIES** On general character and behaviour, both dark and pale morphs most likely to be confused with corresponding plumages of slightly smaller Booted Eagle [230], pale morph of which is, conversely, much the commoner: but, apart from differences in Booted Eagle's pattern (pale upperwing-diagonal, white shoulder lights, whitish U' above tail, black flight-feathers below and, on pale morph, darker head), shape also distinct (stockier, with broader and more curve-edged wings, usually spread tail). Flight shape also distinguishes Wahlberg's from larger and rounder-tailed brown *Aquila* eagles, such as adults of both morphs of Tawny [220] and, during October-April, of pale-rumped migrant Lesser Spotted [218] (which, in

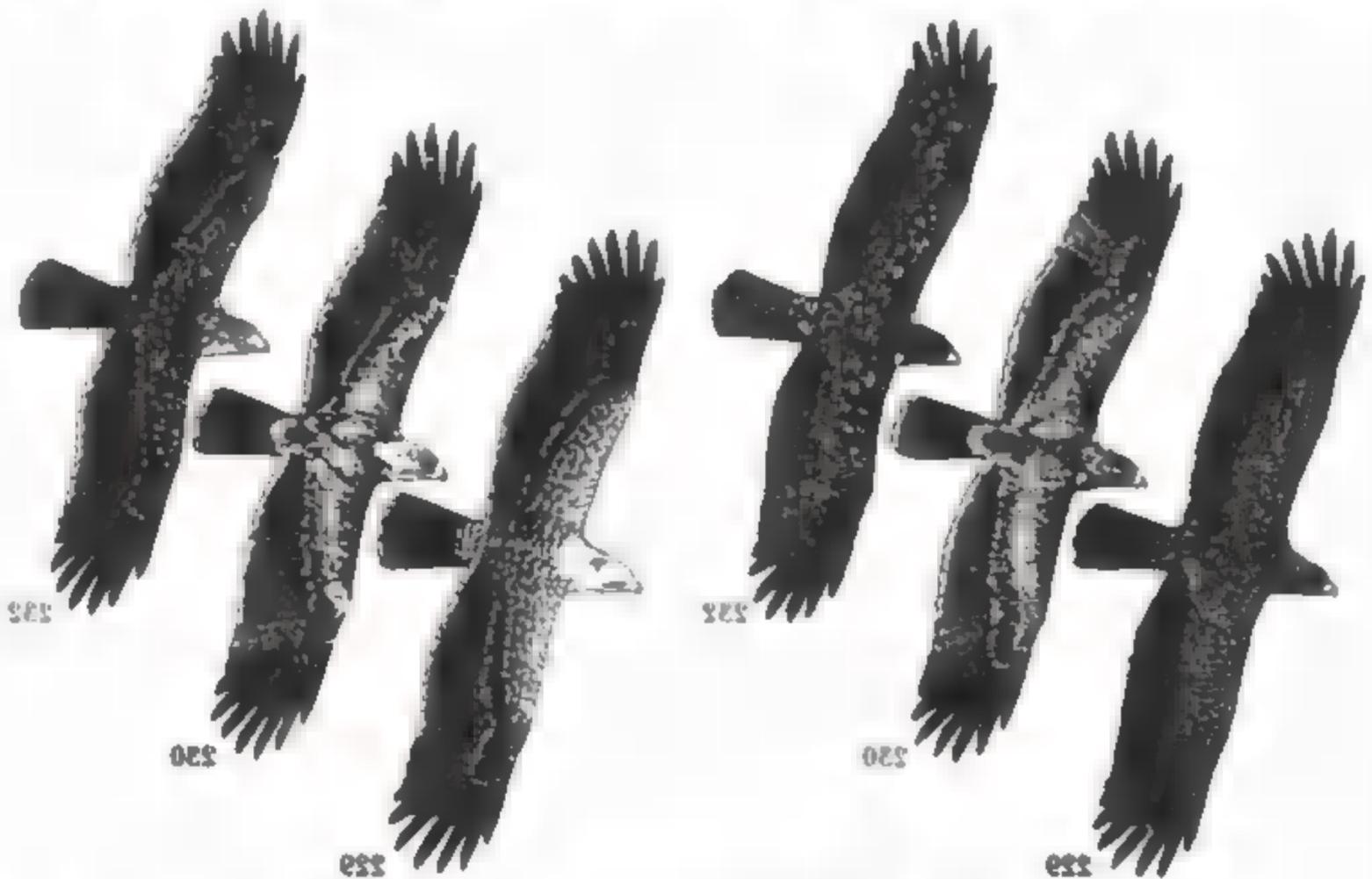


Fig. 50. Comparison of three smaller hawk eagles in the Afrotropical region: Wahlberg's Eagle *Hierwaetus wahlbergi* [229], an intra-African migrant that breeds mostly south of the equator and winters chiefly north of it; Booted Eagle *H. pennatus* [230], a mainly Palearctic species that spends the northern winter in sub-Saharan Africa, but has also established a breeding population in southern South Africa; and Ayres's Hawk Eagle *H. ayresii* [232], an African resident that moves north or south to varying extents in the rainy seasons. All may be seen at the same or different times in much of sub-Saharan Africa except the densely forested and the arid northeast. The three on the left are dark morphs: Wahlberg's uniform dark brown with rather straight-edged wings; Booted with diagnostic pattern of light and dark (see 'Flight' text), including pale wedge on inner primaries and small white 'landing lights' at bases of leading wing-edges; and Ayres's (dark morph rare) all blackish but for barred tail and flight-feathers, similar 'landing lights', and variable whitish flecking on body or coverts. The three on the right are pale morphs: Wahlberg's with white head and pale shoulders; Booted with much the same pattern above as its dark morph (though very different underneath), apart from creamy rear crown and nape and paler wing-coverts and scapulars; and Ayres's (shown as juvenile) with paler head than adult and scaly-looking forewings, but still 'landing lights' and similar, if more closely barred, tail.

addition, has tight trousers when perched and blackish quills in flight below) and Steppe Eagle [221]. Other brown raptors to be borne in mind – though all have different shape in flight and are readily distinguished by bare legs when perched – include Black Kite [39], dark Northern Marsh Harrier [100] and various dark buzzards. Obviously bare-legged Brown Snake-eagle [70], otherwise superficially similar when perched, has much bigger head and yellow eyes and, in flight, more contrasted underwings with curved trailing edges.

**VOICE** Often silent except around nest; perhaps noisier before breeding and during pre-migratory period afterwards. Main call, frequently when circling at great height but also from perch, is loud, shrill, whistled *kleee-ee* or *kleee-ay*, more wailing and drawn out than African Hawk Eagle [228]. Gull-like yelp, with male answering female, may be a variation of this. Other calls include rapidly repeated *kyip-kyip-kyip* of greeting at nest; and high-pitched squealing.

**FOOD** Reptiles, mammals and birds, in roughly equal proportions or one dominating (but, since lizard prey, unlike bird and mammal prey, leaves no remains, may specialise on lizards more than realised); also, more locally, some amphibians (mainly frogs) and insects (beetles, grasshoppers, termites). Reptiles mainly ground lizards (small to quite large), few snakes. Mammals mostly small rodents but sometimes mongooses, young hyraxes and, occasionally, bats. Assorted bird prey ranges from larks and nestling starlings to francolins *Francolinus*, guinea fowl, egrets and small bustards, with kestrel, Gahar Goshawk [107] and owls also recorded; quelea colonies are preyed on, and nestlings of other small birds taken. One pair raised young almost entirely on colony of Black-headed Herons *Ardea melanocephala* and Cattle Egrets *Bubulcus ibis*: obtained chicks by circling over and then stooping to nest; or flying in at tree-top level and singling out nest; or circling colony, one stooping and putting occupants to flight, while other attacked nest. Takes most vertebrate prey on ground, but will dive into tree foliage and pursue birds among branches. Probably forages mainly from low-level flight or higher circling, when, perhaps after losing height by parachuting on raised wings, attacks with fast stoop. Sometimes still-hunts from hidden perch, but occasionally even more openly: one waited on tree and then flew at emerging bats by chase or sudden approach around tree or building. Particularly when on migration, often catches insects at grass fires, sometimes hawking these or alate termites in flight. Has been known to pirate food from Long-crested Eagle [235].

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs; many probably migrate singly, but others occur in loose flocks on migration (see Movements). Courtship flights often brief and, though noisy, generally involve no more than mutual circling, though sometimes adjacent pairs perform together. Male sometimes dives at female, who rolls and presents claws; undulating sky-dance also recorded.

**BREEDING** Over much of range, particularly from Ethiopia to southern Africa, almost entirely confined to September–February, with laying unusually synchronised into restricted period, regardless of rainfall, after

relatively rapid construction or repair of nest; but in West Africa breeds in north of range, June–November. Nest is relatively small structure, 45–80 cm across and 25–60 cm deep, lined with green leaves, usually at 8–12 m inside canopy of baobab, acacia, eucalyptus or other tall tree, often by watercourse or base of hill. Clutch 1 (1–2). Incubation 44–46 days. Fledging 62–80 days, generally 70–75 days.

**POPULATION** Probably Africa's commonest but most unobtrusive eagle. In south, arriving as migrant at times of seasonal food abundance, occurs in larger numbers than resident eagles and densities of 1 pair/4.4–26 km<sup>2</sup> recorded. Highest was in western Sabi Sand Reserve, northeastern South Africa, where 19.5–22.9 pairs/100 km<sup>2</sup> in each of four years (highest elsewhere in that region, including Kruger National Park, was 11.2–11.8 pairs, and in other African countries 1–3 pairs): on that basis there could be several tens of thousands of pairs south of Zambezi–Okavango alone, and indeed southern African total in early 1990s estimated at 100,000 birds. In Kenya, too, regarded as commonest eagle in suitable habitat during August–April: in Tsavo East breeding pairs need 55–75 km<sup>2</sup>. On migration in north Uganda in March and July–August, 1,000+ sometimes recorded daily. Elsewhere often overlooked and underestimated, but total African population must surely run well enough into six figures. Interestingly, eight studies throughout Africa showed breeding output markedly affected by population density, but unaffected by latitude or annual rainfall: in four years in high-density Sabi Sand Reserve, 136 pairs made only 88 breeding attempts and reared only 0.31 young/breeding pair annually, whereas low-density populations elsewhere produced 0.6–0.8 young/pair. Some suffer from human interference, accidental poisoning, or felling of tall trees, but little evidence of significant decline; though some populations have decreased locally (in 1980s, for example, 23 pairs down to eight in one part of southeastern South Africa), no reduction in high-density Sabi Sand (even though loss of adults was not compensated for by production of young).

**GEOGRAPHICAL VARIATION** Monotypic. Proportions of morphs vary both regionally and locally: in particular, pale morph variously estimated at 5–13% in different parts of southern Africa, but apparently more uncommon in East and rare in West.

**MEASUREMENTS** ♂ wing 400–435 mm, ♀ 435–445 mm; ♂ tail 215–230 mm, ♀ 235–250 mm; ♂ tarsus 71–76 mm, ♀ 79–82 mm. **Weights** ♂ 437–845 g; unsexed 670 g–1.4 kg (42).

**REFERENCES** Ash (1991), Auburn (1988, 1991), Benson & Benson (1975), Biggs *et al.* (1979), Britton (1980), Brown (1952, 1955, 1976b, 1978), Brown *et al.* (1982), Cackett (1969), Cannell (1970), Gargett (1968), Gaugris *et al.* (1981), Ginn *et al.* (1989), Grimes (1987), Kemp & Kemp (1998), Kemp & Mendelsohn (1975), Lees (1968), Lewis & Pometoy (1989), Maclean (1993), Meyburg *et al.* (1996), Pickford *et al.* (1989), Pinto (1983), Simmons (1991b–c, 1992b, 1993a/b), Smeenk (1974), Stephens & Blackwood (1983), Steyn (1962, 1980, 1982), Tarboton (1977d, 1986), Tarboton & Allan (1984), Thiollay (1975a–b, 1977a/b, 1978b/c, 1985d), Tuer (1975) Vande Weghe (1979) van Zyl (1992), Zimmerman *et al.* (1996).

**PERCHED Pale-morph adult** Mainly brown above, or dusky-streaked, with blacker flight-feathers, apart from light-streaked forecrown, conspicuous cream to golden hind-crown and nape contrasting with dark cheeks, and distinctive light panels across median wing-coverts and on scapulars; small white patches ('headlights' or 'landing lights') often visible where wings join body; tail dark above and grey below with indistinct barring; underbody basically creamy-white, streaked blackish on throat and otherwise rather variable from looking almost unmarked at distance (though actually having scattered dusky shaft-streaks and rufous flecks on at least breast and flanks) to more distinctly streaked down to lower breast or even belly (though still looking predominantly white). **Dark-morph adult** Almost identical to pale-morph adult above, including contrasting hindcrown and nape, white 'headlights', and light panels on scapulars and across wing-coverts (though last may not stand out to quite same extent), but underbody very different: usually dark brown with obscure black streaking and variable light spots or streaks, especially on thighs and crissum; under-sides of more dilute individuals can show distinct rufous tinge or even look rich rufous-brown (so-called 'rufous morph'). **Pale-morph juvenile** Very similar to pale-morph adult and almost impossible to distinguish in field when perched, unless it can be seen that pale tips to greater wing-coverts and folded secondaries form two neat lines (these become abraded during first winter); tends to be more rufous on head, while streaking on underbody slightly less sharp and more confined to chest. **Dark-morph juvenile** Again very similar to dark-morph adult but, like pale-morph juvenile, shows neat pale lines along tips of greater coverts and secondaries in unworn plumage; tends to be darker brown above and more uniformly dark below than adult. **Bare parts** Adult eyes dark yellow-brown, orange-brown or red-brown, juvenile dark grey-brown. Cere and feet yellow. **FLIGHT** Medium-sized raptor (among smallest of eagles), with head not unlike buteo, but relatively stocky body, fuller hands (six fingers, not five), more parallel-edged wings (juvenile narrower and more S-curved with even trailing edges), and longer square-ended tail (about equal to wing-base, or slightly less); wingspan 2.7 times total length. Deep, powerful beats with heavy down-strokes and looser upstrokes (cf. Western Honey-buzzard [18]) periodically interspersed with sometimes long glides on arched wings with upswep or flexed fingers, tail usually closed; soars on only slightly bowed wings, fingers still somewhat upcurved, tail usually closed to half-open; hangs motionless in updraughts, but does not hover; makes spectacular stoops on nearly closed wings from high in sky and, during breeding season, has particularly impressive rollercoaster sky-dance. **Pale-morph adult** Mainly brown above, with blacker flight-feathers, apart from diagnostic combination of lighter areas: creamy-yellow hind-crown and nape, emphasised by dark cheeks; conspicuous broad buff to yellow-brown panel on each wing (mainly across median coverts) joining similar-coloured scapular patches on either side of back; and creamy-buff U' at base of tail, which otherwise looks fairly uniformly dark; small white 'landing lights' visible at bases of leading edges of wings, both from above and head-on; below, body and wing-linings look predominantly creamy-white (despite dusky streaks

and rufous flecks of very variable strengths, usually most evident on throat, chest, flanks and, to lesser extent, wing-linings, last of which may also have line of spots along primary and greater coverts) in contrast to blackish flight-feathers relieved only by slightly paler bases to outer primaries and distinctive light trailing wedge formed by innermost 3-4; obscurely barred tail has broader subterminal band behind white tip. **Dark-morph adult** Much like pale-morph adult above, though wing-panels, scapular-patches and U' on tail-coverts all slightly browner-buff and less contrasting; rather variably dark below, ranging from almost uniform dark brown (but for pale wedge on inner primaries and greyish tail obscurely barred like pale morph) to extensively pale-streaked on underbody (especially thighs and crissum) and pale-mottled and spotted on wing-linings; in more dilute individuals ('rufous morph'), underbody and especially forewings quite rufous-toned, while secondaries and inner primaries paler brown and so more obviously barred, thus leaving broad blackish band along middle of wings. **Pale-morph juvenile** Very similar to pale-morph adult and often very difficult to separate; distinguishable only by even white line along tips of greater coverts, and neatly white-tipped tail and trailing wing-edges (these not ragged or uneven), while pale wing-panels also neater and more clearly defined, but all these differences become less marked with wear during first winter; head generally more rufous or rufous-brown, which may extend to chest, underbody often less extensively streaked, forepart of wing-linings may be tinged rufous, usually more regular row of dark spots along greater and primary coverts. **Dark-morph juvenile** Again very similar to dark-morph adult but, like pale-morph juvenile, shows neat whitish lines along tips of greater upperwing-coverts and along tips of secondaries and tail above and below in fresh plumage; tends to be darker brown above and more uniformly dark below than adult. (See also fig. 50 on p. 756.)

**CONFUSION SPECIES** Size, proportions and shape distinctive; and broad pale panel across inner wings, creamy U' on tail-coverts and, if visible, white 'landing lights' form diagnostic combination to make upperside of both colour morphs easily identified. Contrast of predominantly whitish underbody and wing-linings with all-blackish flight-feathers (apart from paler wedge of translucent inner primaries) and rather uniform greyish tail (apart from diffuse darker subterminal band) make pale morph nearly unmistakable over most of range; but dark morph sometimes confused with other brown raptors. In case of pale morph (as seen from below, so leaving aside diagnostic upperparts), perhaps greatest risk is in sub-Saharan Africa with pale-morph Wahlberg's Eagle [229] (more polymorphic, with true pale morph much rarer; underbody, wing-linings and head to mantle whiter and almost plain; straight parallel-edged wings and longer, less chunky body with narrow tail give 'crossed-planks' look in flight); and, to lesser extent, with juvenile Ayres's Eagle [232] (more similar in shape; underbody and wing-linings buff to pale rufous, flight-feathers and tail clearly barred). Over range as whole, superficial problems can be caused in distant flight by pale juveniles of Western and Eastern Honey-buzzards [18, 19] (small head usually light-coloured with dark eye-patches, thinner neck, round-tipped and often

be on one note, or second and third lower, or second highest and third lowest. Sometimes extended into longer series simultaneously accelerating and falling in pitch. Harsher whistles when excited, and softer notes used in contact and during passing of food.

**FOOD** In Australia, mostly mammals, also birds and reptiles, sometimes carrion and insects, rarely fish (possibly pirated?). Mammals often mainly young rabbits weighing under 650 g but, though unable to lift more than 500 g, will sometimes kill rabbits up to 1 kg, occasionally to 1.5 kg; also, in varying proportions, other smaller mammals (one record of local population increasing from one to 32 in response to plague of house mice). Birds include commonly parrots and passerines, rarely to 1 kg (ducks, corvids). Reptiles include dragons, large skinks, rarely snakes. Most prey caught on ground, occasionally in tree canopy. May sometimes still-hunt for ground prey from lower branches or perch-hunt from series of such branches, or even stalk and run after it on ground; but, in general, forages almost entirely on wing by various methods, including transects, soaring, or characteristically hanging on wind, wings thrust slightly forward, alulae projecting and tail fanned; may descend by stages in this last posture, but otherwise drops on to prey feet first with raised wings or stoops from considerable height. Swarming grasshoppers may be hawked in low flight and eaten on wing, or abundant cicadas *Macrotus angularis* flushed by crashing into foliage. Occasionally recorded robbing other raptors.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs or family parties, but as many as six seen together at grasshopper swarm and loose concentration of 32 recorded in area of abundant food. Single and mutual high-circling common over breeding area; male may dive repeatedly at soaring female, who rolls over and presents claws. Chiefly early and late in breeding season, highly spectacular and deeply undulating sky-dance, accompanied by distinctive whistles (see Voice), involves near-vertical stoops of 50–60 m and, with or without beating wings, corresponding steep climbs and upswings, sometimes reversing direction at peak to produce pendulum pattern.

**BREEDING** September–December (late August–January) in southern and central Australia, but March–August farther north. Bulky nest of sticks and twigs, 60–75 cm across and c30 cm (up to 60 cm?) deep, or often in old nest of another raptor, lined with green leaves, at up to 50 m in tree, usually one of tallest available. Clutch 1–2 (1–3). Incubation 33–41 days. Fledging 54–66 days, with dependence for c2 months.

**POPULATION** Recorded densities of 3.7–6.3 pairs/100

km<sup>2</sup> have all been in small study areas in southeastern quarter of Australia (once two nests 300 m apart), and elsewhere this species often much scarcer. Including New Guinea, breeding distribution may involve up to 7 million km<sup>2</sup>, but total population probably does not exceed five figures. Although generally less common than might be expected, nowhere seriously threatened or even much persecuted, although may suffer locally where habitat clearance extensive.

**GEOGRAPHICAL VARIATION** Dimorphic, with regional and possibly ecological differences in ratios of pale and dark morphs. Dark males twice as common as dark females. Fledglings may also be of different morphs within same brood: pale x pale adults produce pale young, but any other parental combination results in either pale or dark. Two races.

*H. m. morphnoides* (Australia) As above; pale morph generally commoner than dark (varying from 4:1 in southeast to 15:1 in west), but numbers more nearly equal in coastal Queensland; rare rufous morph may possibly prove more frequent in desert areas.

*H. m. weiskei* (New Guinea) Distinctly smaller (female size of nominate male); pale morph darker and more uniform above and more broadly streaked below; dark morph rare.

In view of similarities in size, proportions, plumage patterns, range of variation within dimorphism, and various aspects of flight and behaviour, we treat this bird and the Afro-Palaearctic Booted Eagle [280] as forming a superspecies. In that connection, it is interesting to note that the latter's so-called 'rufous morph' is generally regarded as a dilute of the dark morph, whereas the even rarer 'rufous morph' of the Little Eagle, a species which has at least something of a rufous tinge to underbody (and particularly to wing-linings) in almost all plumages, is considered a more richly coloured variant of the pale morph.

**MEASUREMENTS** *H. m. morphnoides* ♂ wing 332–396 mm, ♀ 367–413 mm; ♂ tail 170–214 mm, ♀ 194–253 mm; ♂♀ tarsus 55–72 mm. *H. m. weiskei* ♂ wing 308–317 mm, ♀ 327–342 mm. **Weights** *H. m. morphnoides* ♂ 440–810 g, ♀ 745 g–12.5 k. *H. m. weiskei* one immature ♂ only 483 g.

**REFERENCES** Aumann (1995), Baker-Gabb (1984b, 1985d), Beebler *et al.* (1986), Blakers *et al.* (1984), Bollen (1989, 1991a), Calaby (1951), Coates (1985), Cupper & Cupper (1981), Debus (1983, 1984a/b, 1989, 1990, 1991d), Fleay (1951), Garstone (1989), Hollands (1984), King (1990), Mallinson *et al.* (1990), Marchant & Higgins (1993), Newgrain *et al.* (1993a), Olsen & Marples (1992, 1993), Olsen & Olsen (1993), Olsen *et al.* (1993), Schodde & Tidemann (1988), Slater (1983), Whelan (1992).

## 232 AYRES'S HAWK EAGLE

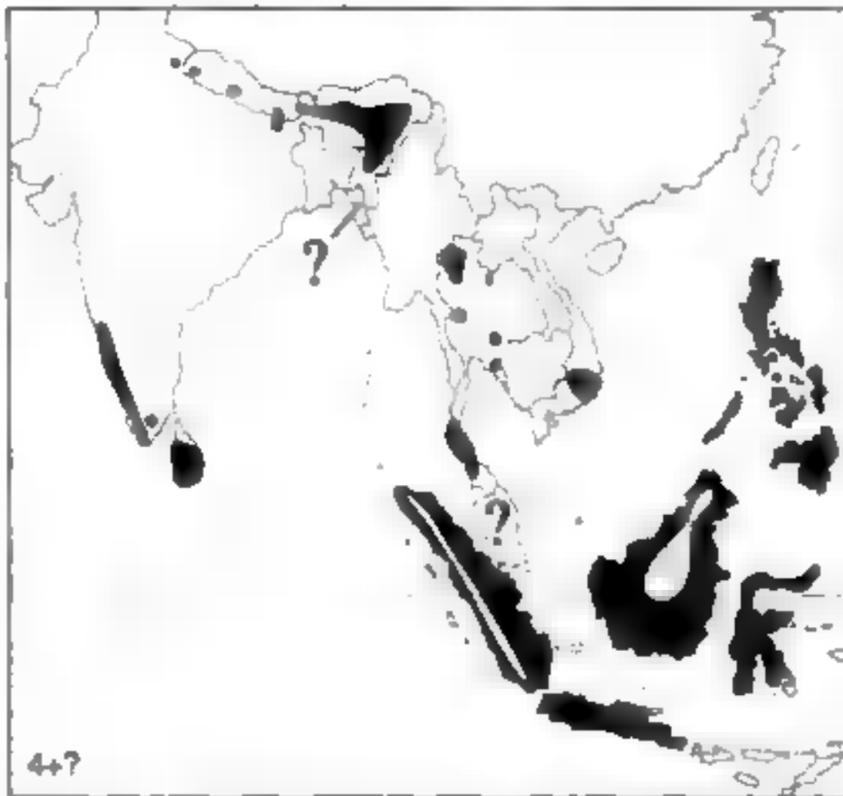
*Hieraetus ayresii* (Gurney, 1862)

Plate 84

Other name: Ayres's Eagle

**DISTRIBUTION** Afrotropical (14°N to 16°S, extending south to c20°S in austral summer, occurring regularly even to c25°S); order 4; local and everywhere scarce to

rare. Sub-Saharan Africa: apart from isolated population in south-central Eritrea and central Ethiopia, patchily distributed in Sierra Leone, north Liberia, Ivory Coast and west Ghana; from southernmost parts of Niger and Chad, extreme southeast Nigeria and west Cameroon



**HABITAT** Evergreen and moist deciduous forest, mainly in foothills, often above river valleys; also hunts over open slopes. Sea-level to 2,000 m, mostly 300 m to 1,200 m; in Nepal recorded only between 200 m and 300 m, but presence to 1,500 m in east thought possible.

**FIELD CHARACTERS** Small, slim and compact-looking eagle, as adult boldly black, white and rufous, with shortish bill, fairly short but distinct crest, longish wings, medium-length tail, feathered legs. Perches very upright, usually hidden in cover; wing-tips well down tail. Sexes similar though female often looks distinctly bigger, averaging only 7% larger (up to 14%) on mainland but nearer 12% (up to 18%) in Indonesia and Philippines; juvenile distinct; at least two intermediate plumages.

**PERCHED** Adult Black above, with obvious glossy black hood and crest, though greater wing-coverts and flight-feathers more blackish-brown in mainland race, and tail browner still (central feathers plain); below, white or faintly rusty-tinged throat (sharply demarcated from black hood) and chest contrast with rich rufous abdomen to crissum and legs, all boldly streaked with black except on throat, central chest and tarsi. **Juvenile** Dark brown above, with paler brown edges and, on lesser coverts, some whitish scaling, but white forehead extending back as broad white supercilia contrasts with streaky brown crown, nape and slighter crest, and with blackish eye-patches above tawny-streaked whitish cheeks; tail greyer, with narrow dark bars and whitish tip; underbody white. **Second/third-year** Black hood may appear in second year, when underparts still white or with only few black streaks, but rufous abdomen probably does not show until third year, when rest of upperparts start to become blacker. **Bare parts** Adult eyes dark brown to red-brown, juvenile brown. Cere yellow. Feet dull yellow. **FLIGHT** Medium-sized raptor with protruding head, longish square-cut tail, and (compared with *Spizaetus* hawk eagles [237–243] of same region) relatively long and narrow wings that appear more pointed, despite well-fingered tips, and have more parallel edges; wingspan 2.3 times total length. Agile flight with fairly deep powerful flaps and intermittent glides; usually glides and soars on level wings pressed slightly forward; dives on closed wings or, with carpals held out and wing-tips on tail, in more of heart-shape. **Adult** Mostly black above

with defined hood, but distinctive pale patches at bases of primaries; below, white throat and chest stand out from abdomen and wing-linings, though the rufous looks simply dusky at distance; at close ranges, black tips of greater, and sometimes median, coverts (which tend to be more blotched than streaked with black like rest of linings and abdomen) give effect of one or two darker lines along rufous mid-wings; undersides of quills greyish and very thinly barred, except for dusky tips to flight-feathers and broader subterminal tail-band, but contrasting translucent round greyish-white windows at bases of primaries. **Juvenile** Rather uniformly dark brown above, with paler edges and narrow tail-barring showing only in optimum conditions, but brown crown and black mask distinctively isolate white forehead and supercilia; pale areas at bases of primaries correspond to adult's; whole underbody and wing-linings plain white apart from odd blackish streaks and spots along greater coverts, also forming arc or patch on primary coverts, and variable dark patch on upper flanks; undersides of flight-feathers and tail greyish and thinly barred, but with translucent round white windows at bases of primaries. **Second/third-year** Intermediate (see 'Perched').

**CONFUSION SPECIES** Adult fairly unmistakable, with pattern recalling giant-sized Oriental Hobby [297] (juvenile of which even has black streaks on rufous underparts), though at distance, when rufous looks dusky, underwing pattern resembles one form of Common Buzzard [203]. Immature also distinctive once black hood or rufous abdomen begin to appear. Juvenile most likely to be confused with juveniles of *Spizaetus* hawk eagles [237–243] (paler-headed, without dark crown and mask, and most either more distinctly crested or lacking any crest, with whiter-edged wing-coverts, shorter folded wing-tips, broader wings mostly with more bulging secondaries and rounder tips, and rounder-ended tail). See also pale-morph Booted Eagle [230] (under-recorded migrant in southeast Asia, of similar size and behaviour, but flight-feathers contrastingly dark below, buff diagonals on mid-wings above, pale U on rump); and juveniles of Short-toed Snake-Eagle [67] and Crested Serpent-eagle [74] (or related species on islands).

**VOICE** Silent except in breeding season. Call usually described as piercing or plaintive scream, even likened to Black Kite [39]. High-pitched *kliu* may be same or similar, but 'high-pitched double scream, preceded by three or four notes ascending the scale *kk-kk-kk-kk-kore-kree*' and 'high-pitched scream *chirrup* preceded by several ascending preliminary notes' are evidently much more extended sounds.

**FOOD** Fairly large birds, smaller mammals. Records include Kalij Pheasant *Lophura leucomelana*, junglefowl and poultry *Gallus*, spurfowl *Galloperdix*, hill partridge *Arborophila*, green pigeon *Tyrton*, Feral Pigeon *Columba livia*, kingfisher, and squirrels. Still-hunts from concealed or open perch, or, more spectacularly, stoops in heart-shape (wing-tips folded to tail-tip) from soar or low transect-flight or glide, in any event striking prey falcon-like in air, or on tree or ground, or following it accipiter-like into foliage.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Single or mutual high-circling in breeding season. Aerial acrobatics include undulating sky-dance with heart-

shaped dives and wing-quivering or wing-shaking, suggesting patterns comparable to Booted Eagle [230] and other congeners.

**BREEDING** Little known. December–March in Sri Lanka and southwest India, February onwards in Philippines. Large stick nest, up to 1.2 m across and 60 cm deep with repeated use, lined with green leaves, at c25–30+ m in tall forest tree. Clutch 1. Incubation and fledging periods not recorded.

**POPULATION** Patchily scattered over – on a very rough, and perhaps overgenerous, estimate – about 2.6 million km<sup>2</sup>, of which two-thirds is made up of Greater Sundas, Borneo, Sulawesi and Philippines. Though apparently still ‘common’ in both southwest and northeast India, seems ‘uncommon’ to ‘rare’ nearly everywhere else. Around 1 pair/500 km<sup>2</sup> would be necessary to put breeding population over five-figure mark, and total in upper thousands is probably most that could be expected. Perhaps this often unobtrusive species is under-recorded: ‘the relatively high number of recent records throughout its range’ does not agree with its reported rarity in Indonesia (van Balen) – yet 17 days of raptor survey the length of Sulawesi in August 1987 failed to produce a single one (Meyburg & van Balen). Sulawesi is still

extensively forested, but over range as whole continuing habitat destruction must be affecting this species.

**GEOGRAPHICAL VARIATION** Two races.

*H. k. hienerii* (India and southeast Asian mainland, with Sri Lanka and Hainan) Larger; less solidly black above, with browner greater coverts, flight-feathers and tail.

*H. k. formosus* (Greater Sundas, Borneo, Sulawesi, Philippines) Much smaller, with greater RSD; more uniformly black above.

**MEASUREMENTS** *H. k. hienerii* ♂ wing 380–394 mm, ♀ 395–433 mm; ♂ tail 204–211 mm, ♀ 216–242 mm; ♂♀ tarsus 73–82 mm. *H. k. formosus* ♂ wing 324–340 mm, ♀ 360–382 mm. **Weights** *H. k. formosus* ♂ 732 g (one).

**REFERENCES** Ali & Ripley (1978), Ash (1984), Bishop *et al.* (1994), Brown (1976b), Cheng Tso-hsin (1987), Clark & Schmitt (1993), Deignan (1945), Dickinson *et al.* (1991), Grimmett *et al.* (1998), Henry (1998), Inskipp & Inskipp (1991), King *et al.* (1975), Lekagul & Round (1991), MacKinnon & Phillipps (1993), Medway & Wells (1976), Meyburg & van Balen (1994), Meyer de Schauensee (1984), Smythies (1981, 1986), Stresemann (1940a), Thiollay & Meyburg (1988), van Balen (1994), van Marle & Vrous (1988), Wells (1999), White & Bruce (1986).

## 234 BLACK-AND-WHITE HAWK EAGLE *Spizastur melanoleucus* (Vieillot, 1816)

Plate 73

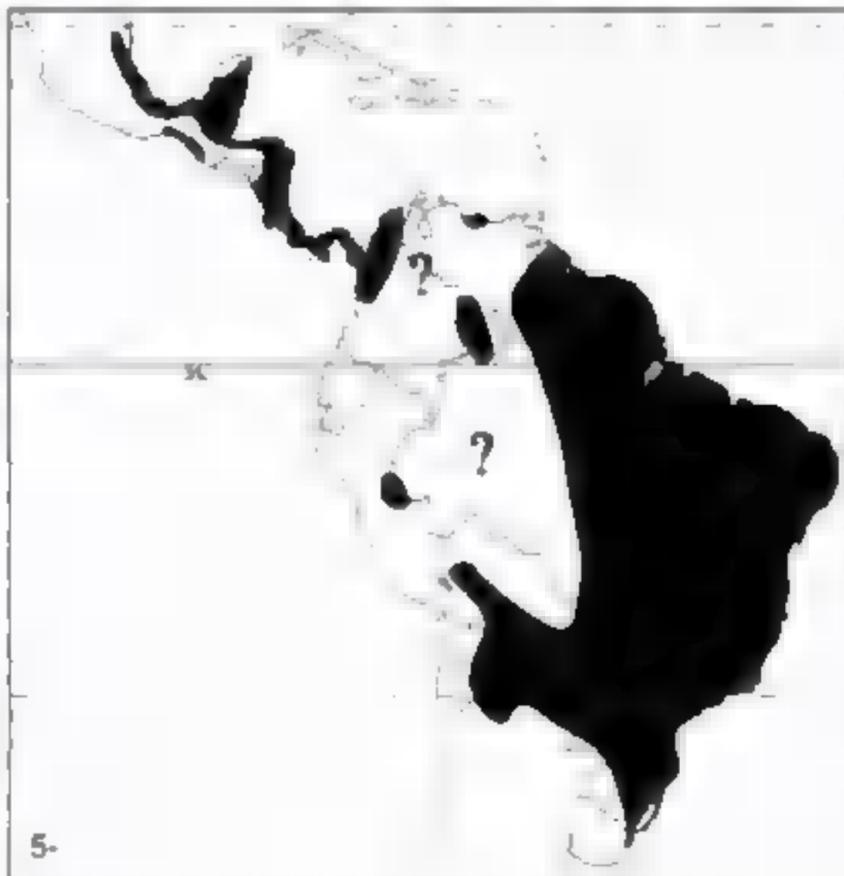
**DISTRIBUTION** Neotropical (23°N to 28°S); order 5; wide but patchy distribution and, even if very locally more numerous, generally rare to uncommon. Central America and northern two-thirds of South America: southern Mexico, mainly on Caribbean slope (south Tamaulipas to east Yucatan and Quintana Roo) but also on Pacific side (isolated record in south Nayarit, otherwise east Oaxaca and Chiapas), through Belize, north and south Guatemala, and north Honduras into Nicaragua and along both sides of Costa Rica and Panama; thence west of Andes to southwest Colombia and

tropical west Ecuador, but more especially north and east of Andes in Colombia, Venezuela (mainly north and parts of south) and Guianas, patchily through Brazil (chiefly Roraima in north and, south of Amazon, Mato Grosso and southern Pará to, perhaps, Santa Catarina) west from upper Amazon into northeast Peru (Loreto) and thence down east side of Andes, particularly in the steep Amazon-facing yungas of east Bolivia (Beni, La Paz, Cochabamba, Santa Cruz, Tarija) on into northwest Argentina (Jujuy, Salta and south to Tucumán, where nesting proved in 1950s and where species still recorded), also from farther east in Brazil through east Paraguay into northeast Argentina (Misiones).

**MOVEMENTS** Probably fairly sedentary, but casual records outside known breeding ranges in Mexico (Yucatan), north Argentina (east Formosa, Carrizentes) and southeast Brazil (Rio Grande do Sul, where bred in 1880s south to 31°S), and at much higher altitudes than usual elsewhere, may indicate some wandering, or simply dispersal by juveniles.

**HABITAT** Edges, gaps and clearings in humid and wet tropical and subtropical forest, in both lowlands and foothills, especially near rivers or open country; also gallery strips and, sometimes, fairly isolated wet savannah woodland. Sea-level to 1,700 m (locally 2,000 m<sup>2</sup>), mainly below 1,500 m, but occasionally wanders to 3,000 m.

**FIELD CHARACTERS** Small stocky eagle of buteonine proportions, contrastingly pied at all ages, with relatively large bill, flat head, short bushy erectile crest, longish wings and medium-longish tail, fully feathered legs, and large feet. Perches very upright both within tree canopy



**235 LONG-CRESTED EAGLE**  
*Lophaetus occipitalis* (Daudin, 1800)

Other name: Long-crested Hawk Eagle

**DISTRIBUTION** Afrotropical (17°N to 34°S); order 5+; widespread, but varies from rare to locally common. Sub-Saharan Africa: south from southernmost Mauritania, Senegambia, central Mali, Burkina Faso, southern Niger, central Chad and Sudan, northern Ethiopia and north-west Somalia, down to western and northern Angola, north-east Namibia, northern Botswana, Zimbabwe, Mozambique, and eastern and southeastern South Africa.



**MOVEMENTS** Often sedentary, but in other areas nomadic, moving out or on after breeding, perhaps in response to fluctuating populations of rodents: in southern and eastern parts of range, following good rainy seasons, well known for suddenly appearing, and even breeding, in temporarily wet areas. Juveniles also more dispersive.

**HABITAT** Woodland, forest edge, damp wooded savannah, and riverine forest strips, especially where short marshy grassland available with good lookout posts. Very adaptable, and often commonest when wooded areas partially cleared for agriculture, even close to villages, and around eucalyptus and other plantations. Wanderers may appear in much more open grassland, often by roadsides, and individuals will spend several days at sites of grass fires. Sea-level to 3,000 m, mainly below 2,000 m.

**FIELD CHARACTERS** Small eagle, black or dark brown in all plumages, with weak bill but large gape, pointed head, longish feathered legs, small feet and, above all, long floppy crest. Perches prominently, and rather upright; wing-tips well down tail (usually exceeding penultimate dark band); uses any open perch, whether tree, post, pole or pylon, watching ground below for many minutes before moving to next perch. Sexes similar (male probably slightly longer-crested), but female averages 7% larger and 27% heavier; juvenile separable; much as adult after first moult starting towards end of first year.

**PERCHED Adult** All black, or in worn plumage dark brown, but for white-edged shoulders (more visible from front), more or less white-feathered tarsi, and boldly

banded grey and black tail with white tip behind broader subterminal black band. (Variations in plumage tone are also affected by fading and abrasion, but, unless in moult, males have noticeably longer crests than females; and, while males have white-feathered legs, it has been shown by Hall that, at least in southern Africa, some females have this white replaced by dirty white to brownish on the tarsi and by brown or blotchy brown on the thighs; as other females sport white legs, this browning may perhaps have something to do with increasing age.)

**Juvenile** Similar but browner, with shorter crest (especially young female) and more thinly barred tail; also more prominently white-edged shoulders, some pale brownish or white tips on crown, nape and wing-coverts, and grey (not yellow) eyes; tarsal feathering apparently always pure white. Crest said to reach adult length at six months (three months after leaving nest), but captive juvenile moulted towards end of first year and new crest was no longer than previous one. Otherwise, indistinguishable from adult after first moult, except that eyes still only dull yellow until well into second year. **Bare parts** Adult eyes yellow to golden-yellow, juvenile grey, but turning hazel (at c6 months) and then dull yellow (at c12 months). Cere and feet yellow.

**FLIGHT** Mid-sized raptor with well projecting head, prominent tail, and very broad and well-rounded wings; wingspan 2.2 times total length. Distinctive fast shallow beats, interspersed with glides, when taking off or flying low; soars with wings held flat and forward, tail often spread. **Adult** Black above but for conspicuous white windows and banded tail; below, black body and wing-linings (but for thin white leading edges) contrast particularly with white-based primaries that stand out as white circular patches at heights when even the banded tail hardly clear; barred secondaries can look quite dark or, at closer ranges, pale enough to show up broad black trailing edges, while whitish tarsi usually obvious against black abdomen. **Juvenile** Browner; distinguishable in flight only by whiter-mottled wing-linings, thinner dark trailing edges, and more narrowly barred tail.

**CONFUSION SPECIES** Unmistakable at all ages, whether perched or flying.

**VOICE** Noisest when breeding, but may be heard at any season. Main call, from perch or when soaring, is loud screaming *kerree-eh*, sometimes even more drawn out, male always higher-pitched than female. Also from perch, often for minutes on end, series of sharp *kik-kik-kik*, notes interspersed with or ending in querulous *ker-eh*. Variety of other calls at or near nest, including repeated *kurr kurr*.

**FOOD** Almost entirely small rodents (98% in one survey in northeastern South Africa, of which great majority were diurnal vlei rats (*Thomomys*)); also some ground-feeding birds (mainly small, but up to size of Red-necked Sparrow *Francolinus afer*) and their young, and variety of occasional prey items including lizards, small snakes, insects, crabs, and trout at hatchery, as well as mulberries and wild figs. Exclusively still-hunts. Virtually all prey

**FIELD CHARACTERS** Small sturdy eagle, blackish and white as adult, with powerful feathered legs, short wings, and longish tail. Difficult to see perched, probably mainly within canopy; wing-tips not far beyond tail-coverts. Sexes similar, but female perhaps 6–16% larger; juvenile separable.

**PERCHED Adult** All blackish above, but for white feather-bases showing through; grey-brown tail has three narrow blackish bars, broad subterminal band and thin white tip; below, largely white, blotched black only on chest-sides, flanks and outer thighs; legs plain white. **Juvenile** Brown to grey-brown above, lightly buff-edged, with black-streaked rufous head and much narrower subterminal tail-band; more or less white below, but variably tinged rufous-buff, with thin streaks on throat, scattered blackish spots on breast, these becoming heavier on flanks (and sometimes abdomen) and browner on undertail-coverts; legs again plain white. **Immature** Apparently darkens above, and becomes plainer and whiter below, but neither intermediate plumages nor timing clear. **Bare parts** Adult eyes brown to brownish-cream, juvenile grey-brown. Cere and feet pale yellow.

**FLIGHT** Mid-sized raptor with well projecting head, short and broad rounded wings, longish tail; wingspan 2.0 times total length. Flaps and glides through trees, somewhat like large accipiter, but no descriptions available; soars low over forest. **Adult** White-mottled blackish above, with contrasting paler grey-brown flight-feathers and tail, these thinly barred but having broad black trailing edges and subterminal tail-band; underbody mainly white, but much black on wing-linings in contrast to whitish flight-feathers barred grey and outlined in black, and tail more obviously barred and subterminally banded. **Juvenile** Browner above, with streaky rufous head, and less white below, with more blotched body and less strongly marked wings and tail; wing-linings tinged rufous-buff with black spotting mainly on forepart, flight-feathers lack bold blackish trailing edges, and subterminal tail-band much less obvious. **Immature** As body whitens with fewer markings, upperwing-coverts become blacker.

**CONFUSION SPECIES** If seen at all well, unlikely to be mistaken. But, because of short rounded wings, longish tail, basically black and white pattern with darker or spotted flanks, and forest habitat, probably confusable with Great Sparrowhawk [151], females of which, though generally smaller, show some overlap in wingspan and, particularly, total length with male Cassin's Hawk Eagle. Apart from differences in character, Great Sparrowhawk blacker above and differently marked below, with black waistcoat, whiter wing-linings and less contrasting trailing edges. It also has bare yellow legs, as does another forest endemic, West African Serpent-

eagle [87] (in addition larger head, more evenly marked upperparts, different underwing pattern). African Hawk Eagle [228] not a forest species and generally larger, longer-winged and shorter-tailed, with more heavily marked underbody, denser black mid-wings, and barely barred quills. Likewise longer-winged and shorter-tailed, Ayres's Hawk Eagle [232] has evenly blackish-blotched wing-linings and underbody (including legs), and darker flight-feathers and tail with less contrasting trailing edges and subterminal tail-band; juveniles also quite different, though some similarities in flight patterns of immatures.

**VOICE** Long, clear high scream, *weeee-e* or *reeeee-eh*, lasting 1–2 seconds, while soaring.

**FOOD** Only birds and tree squirrels recorded from stomach contents of specimens. Thought to catch prey in canopy, but hunting methods not described.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs. Soars over forest, but no description of displays.

**BREEDING** Only handful of nests recorded. Eggs laid October–December in Ghana and Gabon and December in Uganda. Nest is large stick structure, lined with green leaves, high in tall forest tree (one nest used in successive seasons). Clutch 1–2? Incubation and fledging periods unknown.

**POPULATION** Almost no data on numbers for this hard-to-locate raptor, other than that three specimens being 'obtained' in only 11 days in one small part of Kalinzu Forest, southwest Uganda, suggested that it might be less scarce than generally supposed (Friedmann & Williams). In 1980, Britton considered it 'reasonably common at 1,550–2,300 m' both there and in the Impenetrable Forest to the south. Although original range may have covered more than 1.5 million km<sup>2</sup>, habitat greatly decreased in Upper Guinea forests and gradually eroded by felling and human disturbance farther east into DR Congo. If, say, each pair needs 100 km<sup>2</sup>, and the available habitat in West and Central Africa across to Uganda is still 1 million km<sup>2</sup>, the population might be 10,000 pairs, but it could easily be very much less and it seems safer to expect the number of birds (not pairs) to be no higher than four figures.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 330–341 mm, ♀ 381 mm; ♂ tail 211–234 mm, ♀ 266 mm; ♂♀ tarsus 70–84 mm. **Weights** ♂ 938 g–1.05 kg (two), ♀ 1.15 kg (one).

**REFERENCES** Bannerman (1953), Britton (1980), Brusset (1971), Brown *et al.* (1982), Chapin (1932), Friedmann & Williams (1970), Grimes (1987), Macdonald (1980a), Macdonald & Taylor (1977), Skorupa (1981), Snow (1978), Thiollay (1985d).

## 237 CHANGEABLE HAWK EAGLE

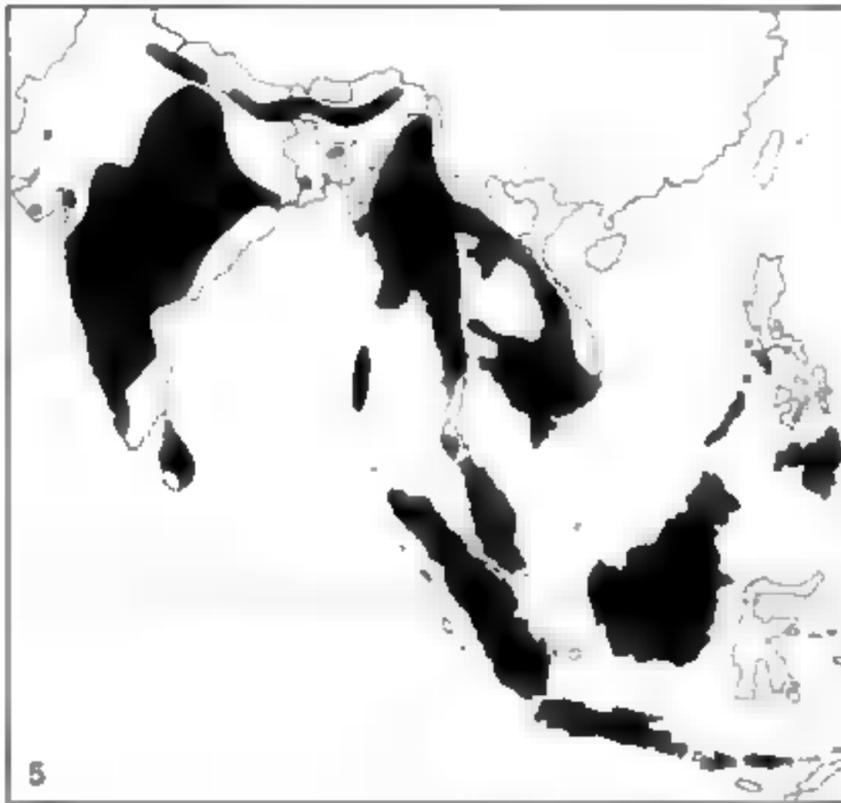
*Spizaetus cirrhatus* (Gmelin, 1788)

Plate 76

Other names: Marsh, Indian Crested (*cirrhatus*) or Sunda (*florus*) Hawk Eagle

**DISTRIBUTION** Indomalayan (30°N to 9°S); order 5;

extensive range, widespread and generally uncommon to fairly common. Indian subcontinent, southeast Asia, Malaysia, western Indonesia and Philippines; Sri Lanka, peninsular India (north to Rajasthan, Uttar Pradesh,



Bihar, Orissa); Himalayan foothills in north India (Garhwal to Assam) and south Nepal and Bhutan, through east Bangladesh, Burma, western Laos, south Vietnam, Cambodia, Thailand and peninsular Malaysia into Andamans, Sumatra (including Simeulue and Mentawai off west side and Riau, Bangka and Belitung off east), Java, Borneo, and west and south Philippines (at least Palawan, Calamian, Lubang, Mindoro, Mindanao, apparently recently Bohol); also Lesser Sundas (at least Sumbawa and Flores).

**MOVEMENTS** Largely sedentary, apart from dispersal of immatures. Peninsular Indian race (see Geographical Variation) has straggled to northeast Burma and southeast Thailand, while some records in Lesser Sundas (Bali, Palu and, once, Lombok) may also relate to vagrants from Java or Flores.

**HABITAT** Savannah woodland, cultivation with trees, timbered watercourses, tea plantations, forest villages, even suburban edge (peninsular India, Sri Lanka) to fairly open or less dense evergreen or deciduous forest (north India to Sunda), also secondary growth, wetlands. Sea-level to 2,200 m, mainly below 1,500 m.

**FIELD CHARACTERS** Largish, slim eagle, one of two biggest *Spizaetus* hawk eagles (though some of its island races are smaller), as adult brown above and boldly streaked below, with strong bill, long and rather floppy or short crest or none at all (different races), shortish wings, longish thinly-banded tail, long feathered legs. Perches very upright, especially in early morning and in afternoon, usually hidden within or against cover, but in India and Philippines sometimes more openly; wing-tips about one-third to half down tail. Most widespread race commonly polymorphic (see Geographical Variation). Sexes similar, but female averages c7% larger (up to 18–22%) and probably much heavier; RSD less marked in insular races; juvenile distinct; will breed in third year, before fully adult in fourth or later.

**PERCHED** **Pale-morph adult** Mainly dark brown above with paler edges, especially on wing-coverts, but evenly black-streaked rufous-tinged head and neck, black crest where present (peninsular India and Sri Lanka: see Geographical Variation); paler brown tail with thin whitish tip, broad blackish subterminal band and three to four

other narrower, browner and often much more obscure bars; below, white to buff area of throat to breast and upper belly and flanks, more or less boldly streaked with black to dark brown, stands out from brown lower abdomen, which is obscurely barred whitish only on lower flanks, thighs and crissum, more obviously on legs; streaks on throat sometimes coalesce into ragged median and malar stripes; whitish underside of tail shows subterminal band and thin bars. **Intermediate-morph adult** (*limnaetus* only: see Geographical Variation) Similar to pale morph, but grey-brown below with more obscure markings (often appearing unpatterned on belly to crissum). **Dark-morph adult/juvenile** (*limnaetus* only: see Geographical Variation) All dark chocolate-brown to almost black, with variable browner edges, relieved only by greyish inner half of tail, latter sometimes (adults only) with some bars near base. **Pale-morph juvenile** Dark brown above (uppertail-coverts sometimes white, at least in Philippines), but conspicuous whitish edges on mantle and wings; some median coverts can look largely white, greater coverts and often scapulars have broad edges, and even lesser coverts may be clearly scaled; tail light brown with about seven thin dark bars and whitish tip; head varies from buff with white-tipped black crest (peninsular India and Sri Lanka: see Geographical Variation) through whitish with little or no crest (most of range) to pure white with short black crest (Andamans), but always more or less spotted and streaked with black or dark brown, especially on rear crown and nape; variable impression of dusky mask (cf. Rufous-bellied Hawk Eagle (233); underparts vary similarly in ground colour, but in peninsular India and Sri Lanka usually show some thin brown streaks on chest, or small spots on breast, and obscure tawny barring on thighs, legs and crissum. **Pale-morph second/third-year** Forewings and scapulars less white-edged in second year, and underparts begin to show more brown and black markings, but still broadly resembles juvenile until third year, when tail also starts to moult to adult pattern (though *limnaetus*, at least in Philippines, acquires adult tail pattern in second year). **Bare parts** Adult eyes yellow to orange-yellow, juvenile grey-brown to pale greenish-yellow. Adult cere greyish to greenish-brown (or female yellow?), juvenile dull greyish. Feet yellow.

**FLIGHT** Fairly large raptor (leaving aside smaller island races), with prominent head, rather short rounded wings which are still quite broad, if relatively narrower with straighter trailing edges than most Asiatic congeners, and longish rounded to square-ended tail; wingspan 2.0 times total length. Fast agile flight, powerful shallow beats interspersed with glides on flat or bowed wings with carpals well forward (about level with bill) and primaries swept back; soars on gently lowered or sometimes level wings, carpals again well forward, tail often closed. **Pale-morph adult** Mainly dark brown above, but for dark-streaked paler or rufous-buff head (also black crest in peninsular India and Sri Lanka: see Geographical Variation), paler mid-wing diagonals along larger coverts, predominantly paler brown tail with narrow dark brown barring, broader and blacker subterminal band, and thin whitish tip; below, white to buff forebody with variable bold dark streaks (often, but not always, including median throat-stripe) contrasts with mainly rusty-buff to brown lower abdomen, whitish-barréd thighs and crissum, and variously brownish-buff

**BREEDING** November–May in peninsular India and January–April in Himalayan foothills (though mainly from January and February respectively), and comparable in Sri Lanka (continuing to June) and Andamans, but in equatorial Greater Sundas fresh eggs recorded in eight different months from December to October, with main season February–August. Largish stick nest, 95 cm–1.05 m across and, added to each year, 35 cm–1.2 m deep, lined with green leaves, at 6–50 m in crown or high fork of large tree, often by stream or ravine, or on hillside with wide view, but sometimes deep in forest or isolated at village edge. Clutch 1. Incubation and fledging periods uncertain, but in single cases c40+ days and 68 days.

**POPULATION** Easily most widespread of eastern Asiatic hawk eagles, with distribution scattered over some 6 million km<sup>2</sup>, and often the commonest (or least uncommon) and most easily seen. Average density of only 1 pair/1,200 km<sup>2</sup> would give breeding population in five figures, and it seems reasonable to expect this order of magnitude. The crested races of the Indian region, more catholic in habitat choice and more adaptable to human's environment, are generally regarded as fairly common, even if 'very uncommon' in Nepal, while the crestless and more forest-associated form throughout southeast Asia and Greater Sundas to Philippines is mostly uncommon (or less easily seen?). Deforestation and increased disturbance with ever-growing human populations are obvious adverse factors.

**GEOGRAPHICAL VARIATION** Usually divided into two mainland and four island races: one mainland and one island (the westernmost two) are long-crested, Andaman form is short-crested, and second mainland and last two island races have vestigial or no crest; the second mainland race, which extends through the larger Indonesian islands to Philippines and has widest distribution, is polymorphic (dark morph commonest of the three from Malaysia through islands, but pale morph commonest in Philippines).

*S. c. cirrhatus* (peninsular India) Large; monomorphic; relatively pale above with rufous tone to head, less heavily and extensively streaked below, down to lower breast, with darker wing-linings, stronger undertail-barring; juvenile strongly buffy head and underparts variously flecked and spotted; all plumages have long crest (10–14 cm).

*S. c. ceylanensis* (Sri Lanka) Similar and again mono-

morphic, but smaller and paler (birds in southernmost India intermediate, and differences clinal); long crest (>10 cm).

*S. c. andamanensis* (Andaman Islands, ?Nicobars) Still smaller; monomorphic; darker than previous two, more like next; juvenile head and underparts much whiter; short crest (c5 cm).

*S. c. limnaetus* (Himalayan foothills through southeast Asia into Greater Sundas and Philippines) Large; polymorphic; pale morph darker above (in Philippines, head often contrastingly paler), and more heavily and extensively streaked below than *cirrhatus*, down to upper belly, with paler wing-linings, more obscure undertail-barring; juvenile head and underparts largely white; vestigial or very short crest (1–3 cm).

*S. c. vanheurni* (Simeulue Island) Smallest; monomorphic; much less heavily blotched black on whiter-looking breast; no crest.

*S. c. floris* (Lesser Sundas) Largest; monomorphic; mainly white below, but for slight barring and streaking on thighs and wing-linings; no crest.

Variation thus complex, so sometimes divided into two or even three species: (a) crested *cirrhatus* and *ceylanensis*; (b) polymorphic and nearly crestless *limnaetus*, with monomorphic and crestless *vanheurni*; and (c) similarly crestless but largely unmarked *floris*. Short-crested *andamanensis*, however, is very similar in adult and juvenile plumages to pale-morph *limnaetus*, providing link between the two mainland forms. Perhaps *floris* is most isolated taxon.

**MEASUREMENTS** *S. c. cirrhatus* ♂ wing 405–442 mm, ♀ 448–462 mm; ♂♀ tail 280–300 mm, tarsus 102–110 mm. *S. c. ceylanensis* ♂ wing 351–400 mm, ♀ 353–385 mm. *S. c. andamanensis* ♂ wing 330–375 mm, ♀ 358–377 mm. *S. c. limnaetus* ♂ wing 380–430 mm, ♀ 405–462 mm; ♂♀ tail 240–278 mm, tarsus 100–103 mm. *S. c. vanheurni* ♂ wing 312 mm, ♀ 329–337 mm. *S. c. floris* ♂♀ wing 485–495 mm. **Weights** *S. c. limnaetus* ♀ 1.36–1.81 kg.

**REFERENCES** Ah & Ripley (1978), Allen (1949), Amadon (1953, 1982a), Bishop *et al.* (1994), Brown (1976b), Clark & Schmitt (1992), Dickinson *et al.* (1991), Gamauf *et al.* (1998b), Henry (1998), Inskipp & Inskipp (1991), King *et al.* (1975), Lekagu & Round (1991), Mackinnon & Phillipps (1993), Medway & Wells (1976), Naoroji (1985), Schmutz (1977), Smythies (1981, 1986), Thiollay & Meyburg (1988), Tikader (1988), van Marle & Voous (1988), White & Bruce (1986).

## 238 MOUNTAIN HAWK EAGLE

*Spizaetus nipalensis* (Hodgson, 1836)

Plate 75

Other names: Hodgson's, Feather-toed or Legge's Hawk Eagle

**DISTRIBUTION** Indomalayan and easternmost Palearctic (43°N to 6°S); order 4+; extensive range, but generally uncommon to rare. Indian subcontinent, southeast and insular east Asia: Sri Lanka (south-central hill zone) and southwest India (Western Ghats in Kerala and west Mysore); Himalayas from northeast Pakistan (Hazara) through Kashmir, north India, Nepal and

Bhutan to north Assam, thence southward into north and east Burmese highlands and west and peninsular Thailand, probably north Laos and Vietnam, and eastward into southeast China (Yunnan, Guansi and Guangdong northward in east to lower reaches of Chang Jiang in Anhui and Zhejiang), also Taiwan; and Japan (north to southern Hokkaido).

**MOVEMENTS** Probably typically sedentary, but immatures disperse and both they and at least some adults

buff below, with small head, short strong bill, long crest, relatively even shorter wings and longer tail than most congeners, feathered legs. Apparently very unobtrusive, spending much of early morning and afternoon perched upright within canopy inside forest, occasionally at edge, rarely more openly; wing-tips about one-third down tail (slightly more on juveniles). Sexes similar, but female perhaps 12–20% larger; juvenile distinct; immatures distinguishable until fourth.

**PERCHED Adult** Dark brown above (some paler brown feather edges), with purplish cast when fresh, blacker on crown and crest (except in south: see Geographical Variation), but hint of rufous on streaky cheeks and collar; greyer tail with three to four blackish bars near base and broader subterminal band inside white tip; below, throat white, emphasised by black malar and median stripes, chest rufous with bold black streaks, lower breast and upper belly more or less plain rufous, lower belly to crissum and thighs whitish or washed rufous and thickly blackish-barréd, but legs whiter with thinner bars (southern populations have paler ground colour, bars more contrasting: see Geographical Variation). **Juvenile** Back and wings dark grey-brown with whitish edges (and some whitish bases showing through), those on lesser and median coverts forming broad whitish panel (uppertail-coverts also paler, but generally concealed when perched); tail grey-brown with six to eight blackish bars (subterminal sometimes broadest) and white tip; in contrast, head and neck largely white, apart from mainly black crest-leathers and dark loreal area; and whole underbody also white (but in southern populations) hardly obvious pale rufous-buff barring on thighs (see Geographical Variation). **Second/third-year** Although pale wing-panel far less obvious, and tail pattern now often much as adult, can still be very pale, whitish to buff, on head and underbody, but often some rufous to blackish tips on head, dark-streaked breast, brown or rufous tinge to belly (northern population only), dark barring on thighs and crissum. Distinctive throat pattern of dark malar and median stripes apparently not acquired until fourth year. **Bare parts** Adult eyes yellow, juvenile brownish-grey to pale yellow. Cere blackish-grey. Feet yellow.

**FLIGHT** Medium-sized raptor with prominent though slim-looking head, short and rather broad rounded wings pinched in at rear bases, with strongly bulging secondaries and five to six or seven rather shallow-cut fingers, and relatively long square-ended tail looking slightly rounded when spread; wingspan only 1.9 times total length. Flight fast and direct, deep flaps interspersed with longer glides; in soaring, wings well forward and held in shallow V, with tips of spread primaries up-curved; glides with wrists forward and primaries back-swept, tail closed. **Adult** All dark above, crown blacker than cheeks (in southern populations head paler, crown contrastingly so against dark back), flight-feathers somewhat darker than back and wing-coverts, tail greyer with three to four visible black basal bars before wide plain area and then broader subterminal band; below, white throat edged and divided by black stripes, black-streaked rufous chest but plain rufous lower breast and barred cinnamon-rufous to chestnut-brown inner wing-linings, merging to blackish-barréd carpal areas and lower abdomen, against which whiter legs show up (southern birds more contrastingly dark-streaked on whiter breast,

more clearly barréd on belly to crissum and wing-linings: see Geographical Variation); undersides of greyish and thinly dusky-barréd flight-feathers have only slightly paler bases to primaries (though they stand out as pale crescents against dark wing-ends/carpals, especially on males), and grey tail has same pattern as on upperside (three to four bars at base, broader subterminal). **Juvenile** Mainly rather dark above though with various whitish markings, broad whitish panel on inner fore-wings, and white to pale grey U above thinly barréd tail, but head largely white, against which black crest and dusky lores show up; very pale below, with largely white throat to crissum and wing-linings (but southern populations show pale rufous-buff barring on thighs), only thin dusky bars on whitish-grey to whitish quills, against which more strongly marked wing-tips stand out with (when backlit) thin whitish arc across primary bases; five to seven thin dusky bars plus sometimes broader blackish subterminal on whitish-grey tail. **Second/third-year** Intermediate (see 'Perched'); usually less patterned above; below, often dark-streaked breast, brown or rufous tinge to inner wing-linings as well as belly (except in south), and dark barring on greater wing-coverts as well as thighs and crissum by third year; tail and remiges may still retain some juvenile feathers in second year, but new ones darker grey, and more like adult by third.

**CONFUSION SPECIES** Four honey-buzzards are regular in Philippines – one resident race of Barred (20) and two of Eastern Honey-buzzards (19) as well as, in northern winter, the latter's migratory Palearctic form – but none is strikingly similar to Philippine Hawk Eagle through mimicry (cf. Sulawesi Hawk Eagle (240)); their sizes, plumage variations and comparably uneven tail patterns can result in some confusion, but note their bare legs, small bills and heads, longer necks, slimmer builds, longer-looking and more parallel-edged wings, shorter tails, and much deeper wing beats). Nevertheless, white-headed juvenile Barred Honey-buzzard, also with white underbody and linings, looks extremely similar to young Philippine Hawk Eagle, from which best distinguished by less bulky appearance and different wing shape. But probably more problems are caused in Philippines by the other two indigenous hawk eagles, notably in juvenile and younger immature stages. Changeable (237) (race *limnaetus* with only vestigial crest and whiter juvenile plumage) is supposedly restricted to some western and southern islands from Palawan and Lubang to Mindanao, so white juvenile *Spizaetus* on Luzon, Negros and other islands where Changeable is not known to occur have been (apparently wrongly) identified as Philippine Hawk Eagle, even though some have been relatively large and bulky and clearly almost crestless; Changeable has different wing position in soaring, longer and narrower-looking wings with deeper-fingered ends, shorter tail, flatter-looking head with vestigial crest and, as older immature and adult, rufous breast and greyer primaries (call also helpful: see Voice). Adult Rufous-bellied (233) (smaller southern island race *formosus*) quite different, but juvenile, largely white below, needs to be distinguished from juvenile Philippine Hawk Eagle by smaller size, narrower wings, shorter tail, shorter crest, and dark mask, crown and variable flank-patches.

**VOICE** Often very vocal. Short, shrill, two-syllable *yip-yip*, *wheret-whit* or similar variants, different from longer

(multisyllabic) rising screams of equally noisy Changeable Hawk Eagle [237].

**FOOD** Not known, but high RSD suggests bird specialist.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Soars frequently, but no aerial displays described.

**BREEDING** No data. Individual with enlarged gonads recorded in January.

**POPULATION** Generally considered uncommon to rare and increasingly at risk, but apparently very unobtrusive and, even allowing for limited ornithological research in Philippines, surprisingly little known. Thus, despite continuing indiscriminate deforestation there – see Philippine Eagle [216] – could still be more numerous than it appears: the islands total c.300,000 km<sup>2</sup> (though not all have recorded the species and at best, its range probably covers no more than half that). On other hand, enthusiastic assumptions that *Spizaetus* in most of Philippines must be *philippensis* may be misplaced in the face of evidence that Changeable Hawk Eagle [237] (eastern crestless race *limnactis*) is perhaps of wider occurrence there, at least during juvenile dispersal, than the literature suggests (see Confusion Species). A number of juveniles without crests have been (probably wrongly) identified as *philippensis* on various islands from Luzon to Mindanao: perhaps juvenile Changeable is more dispersive than realised, and both species are known from at least two of the larger islands. Thus, for reasons of confusion as well as inadequate data, it is currently impossible to assess the population even in broad terms. Nevertheless, fieldwork in late 1990s estimated 200–220 pairs on Luzon and 320–340

on Mindanao; as these are by far the largest two islands, it would seem unwise to expect a total above the lower end of the four-figure scale. Massive and continuing habitat loss, coupled with considerable pressure from hunting and trapping, means that this small population must be considered vulnerable.

**GEOGRAPHICAL VARIATION** Hitherto treated as monotypic, but recent work by Gamauf *et al.* suggests two distinct forms which are thought to represent subspecies: only northern birds were previously described and illustrated in the literature.

*S. p. philippensis* (Luzon south to Mindoro) Darker on head and underparts, less obvious markings below; see Field Characters.

*S. p. pinakeri* (southern islands of Mindanao, Samar and Negros, presumably also Bohol and perhaps Panay) Paler-headed, with whitish crown, breast clearly black-streaked whitish to buff, lower belly narrowly barred white and rufous-brown, thighs and crissum barred black and white and white wing-linings barred brown to blackish; juvenile has barred thighs.

Forms a superspecies with Mountain, Javan, Sulawesi and Blyth's Hawk Eagles [238–240, 242].

**MEASUREMENTS** ♂ wing 330–353 mm, ♀ 396 mm (one); ♂♀ tail 284–290 mm, tarsus 90–100 mm. **Weights** ♀ 1.17–1.28 kg (two).

**REFERENCES** Amadon (1953), BirdLife International (2000), Brown (1976b), Collar & Andrew (1988), Collar *et al.* (1994, 1999), Dickinson *et al.* (1991), DuPont (1971), Gamauf *et al.* (1998a, b), Gilliard (1950a), Parkes (1971, 1973), Preleuthner & Gamauf (1998), Rand & Rabor (1960).

## 242 BLYTH'S HAWK EAGLE *Spizaetus alboniger* (Blyth, 1845)

Plate 75

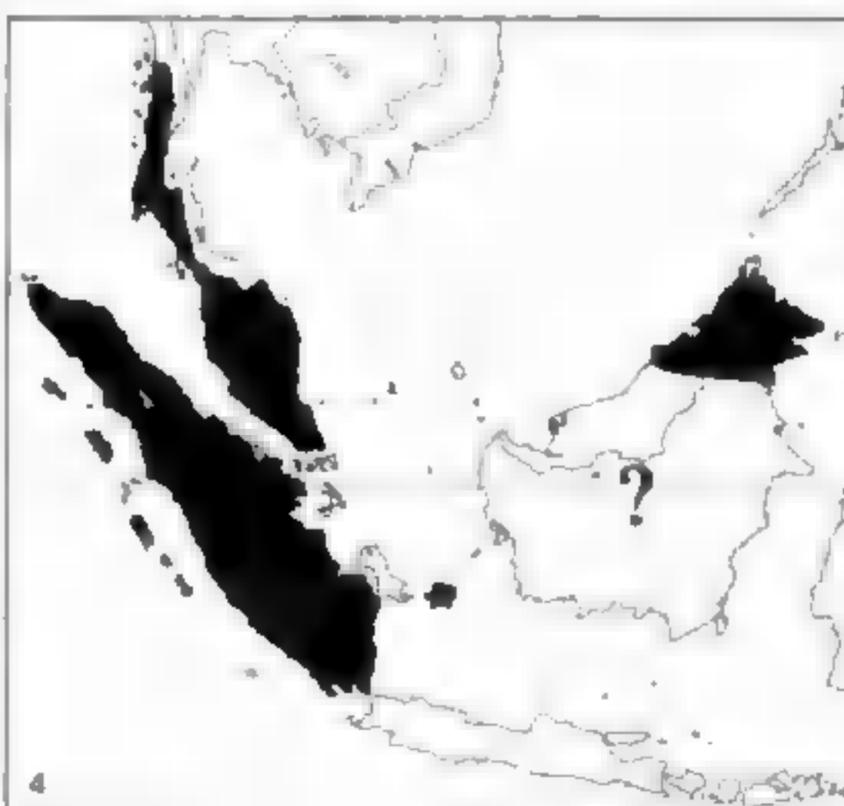
Other names: Mountain or Black-and-white Hawk Eagle (both confusing with other species)

**DISTRIBUTION** Indomalayan (11°N to 6°S); order 4; generally uncommon, but locally fairly common. Peninsular southeast Asia into Malaysia and western Indonesia: extreme southeast Burma (southernmost Tenasserim), south peninsular Thailand and peninsular Malaysia to Sumatra (with adjacent smaller islands, including at least Simeulue, Nias, and Mentawai group to west, and Belitung to east) and Borneo (Gunung Kinabalu in Sabah south through eastern Sarawak to north-central Kalimantan).

**MOVEMENTS** Probably sedentary, apart from local dispersal of immatures.

**HABITAT** Mainly primary evergreen forest, sometimes secondary growth, in hills and mountains, but immatures also wander into more open lowlands. Chiefly 500 m to 1,500 m, but locally down to 200 m and up to 2,200 m.

**FIELD CHARACTERS** Fairly small eagle, as adult black above and black-blotched and barred below, with short strong bill, long crest, short wings, longish single-banded tail, feathered legs. (In hand, middle toe 35 mm or more; cf. Wallace's Hawk Eagle [243].) Less unobtrusive



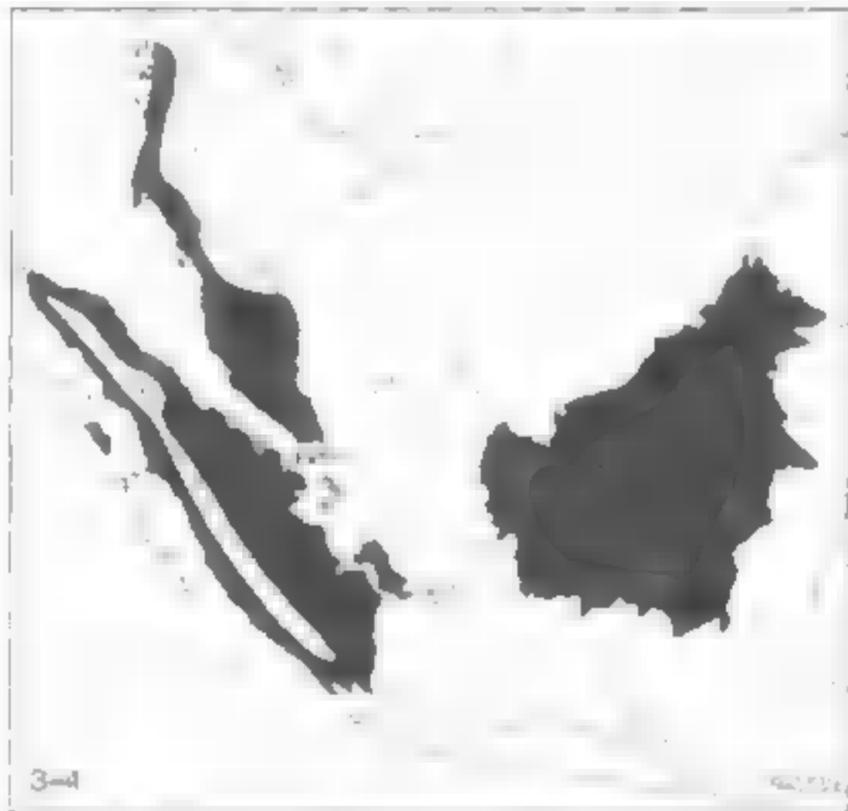
than some congeners, but still tends to perch more or less within canopy of tall forest trees; wing-tips about one-quarter down tail. Sexes similar, but female around 13% (2–26%) larger; juvenile distinct (but cf. Wallace's); as adult after third or fourth year?

## 243 WALLACE'S HAWK EAGLE *Spizaetus nanus* Wallace, 1868

Plate 75

Other name: Small Hawk Eagle

**DISTRIBUTION** Indomalayan (11°N to 6°S); order 3-4; uncommon to rare. Peninsular southeast Asia into Malaysia and western Indonesia: extreme southeast Burma (southernmost Tenasserim) and south peninsular Thailand (probably nearly extinct), and peninsular Malaysia to Sumatra (including at least Nias Island to west and Bangka to east) and Borneo (Sabah, Sarawak and Kalimantan).



**MOVEMENTS** Probably sedentary, apart from local dispersal of immatures.

**HABITAT** Lowland evergreen forest, extending to lower hill slopes; has been recorded in heavily logged forest in some areas, but is apparently unable to tolerate such habitat degradation in others (see BirdLife International). Mostly sea-level to 500 m, less regularly extending to perhaps 1,000 m.

**FIELD CHARACTERS** Smallest of the hawk eagles, as adult brown above and black-streaked and brown-banded below, with comparatively weak bill and feet, long crest, short wings (relatively slightly longer than congeners), longish three-banded tail, feathered legs. (In hand, middle toe 32 mm or less; cf. Blyth's Hawk Eagle [242].) Unobtrusive, little known, probably perches mainly within cover; wing-tips about one-quarter down tail. Sexes similar, and female apparently averages only 2% (up to 8%) larger; juvenile distinct (but cf. Blyth's); as adult after third year?

**PERCHED Adult** Except for tail pattern and more even barring on abdomen, resembles third-year Blyth's: mainly blackish-brown above with paler brown edges, but heavily dusky-streaked rufous-buff head, thinly buff-tipped black crest, and three greyish-brown bars and white tip on black tail; below, throat white with black

malar and median stripes, and breast white to creamy with black streaks, but otherwise all cream to buff, closely and evenly barred with brown or blackish-brown from flanks and belly to crissum and, more thinly, on legs. **Juvenile** Plumage almost identical to juvenile Blyth's, though head generally more buff than tawny, and underbody more cream than buff, palest on throat and legs (head and underparts white in Nias race; see Geographical Variation). **Second/third-year** Changes correspond to those of Blyth's, so plumage remains similar until adult tail pattern begins to develop in third year. **Bare parts** Adult eyes yellow, juvenile greyish to pale yellow. Adult cere blackish-grey, juvenile dull greyish. Feet yellow. **FLIGHT** Smallish to medium-sized raptor with prominent head, rather broad rounded wings slightly pinched in at rear bases, and longish rounded tail; wingspan 2.1 times total length. No descriptions of wing actions. **Adult** Blackish-brown to dark brown above with blacker crown and crest, streaky rufous-buff tinge to cheeks and hind-neck, and three pale bars and thin white tip on black tail; below, median throat-stripe, black-streaked white to creamy breast, and evenly brown-banded cream to buff abdomen, but buff to rufous-buff wing-linings only lightly spotted or streaked (not barred); undersides of flight-feathers mostly greyish with thin dusky bars, but dark-tipped primaries show small whitish area at bases, while tail has white tip and three black and three whitish-grey bands, of which the subterminal black and the whitish behind it are broader than rest. **Juvenile** Apart from tendency to paler head, underbody and wing-linings, and whiter throat and legs, very like juvenile Blyth's [242], though tail-banding more indistinct and uneven with 'honey-buzzard' spacing. **Second/third-year** Intermediate (see 'Perched'); changes correspond to Blyth's, so plumages remain similar until adult tail pattern begins to develop in third year.

**CONFUSION SPECIES** Both adult and juvenile plumages are mimicked by typical morph of sedentary and near-exactly sympatric race *torquatus* of polymorphic Eastern Honey-buzzard [19] (see remarks on mimicry under Sulawesi Hawk Eagle [240]), but that has bare legs, small bill and head, slimmer build, longer neck and wings, and flies with deeper beats. Of the three *Spizaetus* hawk eagles that overlap in broad range – Changeable [237] (completely), Mountain [238] (only slightly) and Blyth's [242] (almost exactly sympatric) – the first two are much larger (while Himalayas to Greater Sunda race *limnortus* of Changeable also differently patterned and has only vestigial crest). But, except fully adult, or at least in third year when distinctive adult tail pattern developing, Blyth's very similar; immature can look much like adult Wallace's (though less evenly barred on abdomen, and contrasting black feathers may begin to show on browner upperparts), while almost identical juvenile possibly indistinguishable in field (Blyth's slightly lower wing:tail ratio, and female slightly

larger, also with deeper buff to tawny head and underparts, more evenly and more clearly banded tail).

**VOICE** 'Shrill, high-pitched *yik-yeo*; second note inflected upwards' (Lekagul & Round); alternatively transcribed as *klit-kleek*. 'Fledged juveniles give high-pitched, breathless *yu-yu-yu-yu* and *ee-ee-ee-ee-eee*' (BirdLife International).

**FOOD** Birds, bats and lizards reported, but apparent low RSD suggests that this may be less of bird specialist, or have narrower range of food size, than some other hawk eagles. No details of hunting techniques.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Aerial displays not described.

**BREEDING** Perhaps November–February: only recorded nest, with large chick in February, at c35 m in low fork of large forest tree. Clutch size (probably 1) and incubation and fledging periods unknown.

**POPULATION** Now classed as vulnerable. Almost identical distribution with Blyth's Hawk Eagle [242], though in this case more lowland than upland, similarly extends over some 900,000 km<sup>2</sup>, but Wallace's generally considered rare to, at best, uncommon. In view of greater destruction of lowland forest, more at risk and perhaps likely to be one point down on the magnitude scale: impossible, however, to guess whether or not average

density exceeds the 1 pair/1,800 km<sup>2</sup> necessary to lift it above three figures. Apart from commercial logging, and clearance for rubber and oil-palm plantations, which together resulted in the loss of nearly 160,000 km<sup>2</sup> of forest in Borneo (Kalimantan) and Sumatra during 1985–97, the impact of the major fires of 1997–98 have yet to be fully assessed, but 'fires appear to be increasing in frequency and severity' in those two largest of the Great Sundas (see BirdLife International).

**GEOGRAPHICAL VARIATION** Two races.

*S. n. nanus* (whole range except Nias) As above; juvenile has cream to pale buff underparts and head, except for black crest.

*S. n. stresemanni* (Nias Island) Adult not described, but juvenile has entirely white underparts (including wing-linings) and head (including crown and hindneck), though still black crest, and broader pale tips and edges to crest and upperparts.

**MEASUREMENTS** ♂ wing 297–316 mm, ♀ 307–321 mm; ♂ tail 215–232 mm, ♀ 227–240 mm; ♂♀ tarsus 78 mm. **Weights** 510–610 g (IBW).

**REFERENCES** Amadon (1953, 1982a), BirdLife International (2000), Brown (1976b), Collar & Andrew (1988), Deignan (1963), Humphrey & Bam (1980), King *et al.* (1975), Lekagul & Round (1991), Medway & Wells (1976), Smythies (1981, 1986), Stresemann (1938), van Marle & Voous (1988), Wells (1985).

## 244 BLACK HAWK EAGLE

*Spizaetus tyrannus* (Wied, 1820)

Plate 73

Other name: Tyrant Hawk Eagle

**DISTRIBUTION** Neotropical (21°N to 28–29°S); order 6; wide distribution and, despite significant decreases in northwest and southeast of range, elsewhere still generally fairly common. Middle America and northern two-thirds of South America: southeast Mexico, mainly on Caribbean side (south Veracruz and east San Luis Potosi to east Yucatán and Quintana Roo), through Belize and along Caribbean slopes of Guatemala, Honduras and Nicaragua – also very locally on Pacific sides of Mexico (Guerrero and Chiapas), Guatemala, El Salvador and Honduras – and on both slopes of Costa Rica and Panama; thence extremely locally west of Andes (not known in Pacific Colombia south of Serranía de Baudó, but recently found in tropical west Ecuador and in Tumbes in northwest Peru), and much more commonly north and east of Andes in Colombia, Venezuela and Guianas, through Amazonia (south to Mato Grosso) and eastern Brazil (Bahia and Alagoas south to, at least formerly, 29–30° in Rio Grande do Sul), into east Ecuador and Peru, north and east Bolivia (Pando, Beni, La Paz, Santa Cruz) and, supposedly still, east Paraguay and northeast Argentina (Misiones, east Formosa).

**MOVEMENTS** Probably mainly sedentary with local dispersal, but vagrant to Trinidad and occasionally outside breeding range in peninsular east Mexico (Yucatán). Status unclear of odd records since 1970s in southeast Brazil and even adjacent northeast Argentina and southeast Paraguay, but these, too, may relate to wanderers.



**HABITAT** Canopy of humid tropical and subtropical forest, especially at edges or along rivers and other openings, also secondary growth and semi-open woodland, in both lowlands and, perhaps more particularly, foothills; apparently prefers broken areas, but also found in continuous forest. Sea-level to 2,000 m, most commonly between 200 m and 1,500 m, but recorded to 3,000 m in Guatemala.

**FIELD CHARACTERS** Lightly built eagle of medium size, mainly black with white markings as adult, with

short bushy erectile crest, relatively short wings and long tail, and fully feathered tarsi. Evidently perches almost entirely within tree canopy (seldom seen except in flight); wing-tips reach or just exceed tail-base. Sexes similar, with overlapping size, but biggest females 9% larger than biggest males; average is 13% greater in nominate eastern race, while the few weights from elsewhere put each of the two females at 21–24% heavier than the one male; juvenile distinct; apparently as adult at around two to three years.

**PERCHED Adult** Predominantly purplish-glossed black, with usually prominent white at base of crest and white barring on thighs and crissum (less clear in eastern South America), also sometimes white flecks on throat and belly and white bases showing through on back; black tail with whitish tip and three broad pale bands (greyish above and whitish below, basal one often hidden). **Juvenile** Quite different: head to chest predominantly creamy-white with dark markings (black and buff mottling on crown and white-tipped crest, dusky ear-coverts, scattered blackish streaks on throat and chest coarsest at sides, mainly brown-streaked nape); otherwise, blackish-brown above with wing- and tail-coverts white-tipped, and mainly dark brown on abdomen apart from obscure whitish mottling, but thighs and crissum barred brown and white; tail with broader white tip and four to five thinner bands of greyish above and whitish below. **Late first-year** Apparently moults head and body after few months, then still much like juvenile, but mantle blacker, chest more boldly streaked with black, and whole abdomen clearly barred black and white. **Second-year** Much as adult, but still has indistinct whitish-streaked supercilia, white flecks or streaks on throat, and some white spotting on belly. **Bare parts** Adult eyes golden-yellow to orange, juvenile yellow-brown to yellow. Cere and bare lores slate-grey. Feet yellow to orange-yellow, juvenile paler.

**FLIGHT** Medium-sized eagle with slender shape, relatively short and very broad rounded wings obviously pinched in at bases of trailing edges, and long tail with squarish or slightly rounded tip; wingspan 2.0 times total length, tail projection slightly exceeds width of pinched-in wing-base, but less than width of mid-wing. Deep powerful beats; 'wings held flattish and slightly pressed forward (so tips often forward of head), tail slightly spread' (Howell & Webb). **Adult** All black above but for white showing at base of crest, three brownish-grey tail-bands and, at close range, narrow whitish tips to tail-coverts; below, head, body and wing-linings appear predominantly black – though thighs and crissum more or less white-banded and, in good light, white speckling visible on wing-linings (white spotting clearer in east Brazil) as well as, sometimes, on throat and belly – but main contrast provided by bold whitish bands on flight-feathers and tail (tail with whitish tip and three bands, of which basal one often hidden by coverts). **Juvenile** Mainly blackish-brown above, with white tips to wing- and tail-coverts at close range, but contrasting streaky-white head and greyish bands (one to two more than adult) on more broadly white-tipped tail; below, creamy-white throat to chest, with variable blackish streaking, stands out from blackish abdomen (later, closely barred with white), dusky-mottled white wing-linings (white spotting clear in east Brazil) and thinly barred flight-feathers and tail. **Subsequent plumages** Two moults

appear to take place within one year, first leaving bird largely as juvenile but for heavily barred abdomen and second as adult but for whitish markings on head and belly (see 'Perched').

**CONFUSION SPECIES** Only other New World raptor that has adult's combination of dark body and wing-linings with boldly banded remiges, as well as rectrices, is rare dark-morph juvenile Hook-billed Kite [15] (much smaller, more paddle-shaped wings, banding far less marked on secondaries, only two much bolder tail-bands, differently shaped bill, bare legs, distinctive proportions and behaviour). Even rarer dark morph of Crested Eagle [213] is also mainly black, but is barred from upper breast downwards and has barred rather than contrastingly banded undersides to flight-feathers (also larger, with proportionally still shorter wings and longer tail, pointed crest and, again, bare tarsi). Ornate Hawk Eagle [245] has comparable shape, but is paler in all plumages: immature might be confused with late first-year plumage of Black, but Ornate smaller, relatively shorter-tailed, always whiter below, never shows dark cheeks between white supercilia and throat. Compare black hawks [177, 178], Black Solitary-eagle [183], Zone-tailed Hawk [199] and dark morphs of other buteos.

**VOICE** Often noisy in soaring flight, uttering series of loud clear ringing whistles variously rendered as: 'rhythmically whistled *whit, whit whit wheereeeeer*, or *whet, whet, witwheereer*, with last note down-slurred (the reverse of Ornate Hawk Eagle [245])' (Hilty & Brown); '*whick whick whick whip-WHEEEew*, the last note longest and highest'; 'drawn-out *whi, whi-wheereooo...* often preceded by several introductory notes... [or] *wh-whi wh-whee-hee-hoo*, or *wh-whee-ee-oo*, thus may suggest Ornate Hawk Eagle' (Howell & Webb); and 'melodious high whistles *reeer-eh-t, t, t, i, i, eus-ur*' (Stiles & Skutch). The drawn-out last double note, or less emphatic version of it with more hissing quality, also sometimes uttered on its own, perhaps mainly when perched. Immatures in flight 'may simply give steady, ringing whistles, *whet whet...*'

**FOOD** Mainly birds and arboreal mammals (marked preference for one or other in different areas); also snakes and large lizards. Bird prey to size of chachalacas (*Oryzopsis* and toucans and aracaris (Ramphastidae) (latter over 50% of prey in one study in southeast Mexico), but also smaller species, and even passerine nestlings recorded. Mammals small to medium-sized, including small monkeys, squirrels, marsupials and, at times significantly, roosting bats. Evidently mainly perch-hunts, scanning around during brief stops between short flights from tree to tree at mid-storey heights, then pouncing or tail-chasing.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Single and mutual high-circling frequent, with much calling, especially mid morning to early afternoon. Talon-touching and rolling-over also recorded.

**BREEDING** Evidently December–August in Central America. Bulky stick nest, c110–140 cm across, variously recorded at 13–20 m in crown of royal palm, or on base of lateral branch or dense tangle of vines in mahogany or other tall emergent tree. Clutch 1–2. Incubation not recorded. Fledging 71 days in one case; dependent juvenile probably then stays close to nest for several months.

either in fork or well out on lateral branch. Clutch 1 (1-2). Incubation c48 days. Fledging variously 66-93 days; dependent juvenile stays near nest for up to 12 months.

**POPULATION** Home ranges variable at different seasons, from 0.6 to 2.0 km<sup>2</sup>, and estimated densities of 1 pair/0.8 km<sup>2</sup> and 13 birds/10 km<sup>2</sup> in parts of Guatemala and French Guiana respectively. Has more extensive range than Black Hawk Eagle [244], limits enclosing over 10 million km<sup>2</sup>, but generally considered much scarcer and less tolerant of partial deforestation and human disturbance in all forms. Has certainly declined in many parts of Central America and Brazil (especially southeast), in areas that total over half entire range. Five-figure population, perhaps in the higher tens of thousands, therefore seems more likely.

**GEOGRAPHICAL VARIATION** Two races.

*S. o. ornatus* (South America east of Andes) Somewhat paler on head and upperparts.

*S. o. vicarius* (Central America to west Ecuador)

Darker upperparts, notably richer rufous on head and neck, darker face markings, broader tail-bands.

See Confusion Species for supposed dimorphism.

**MEASUREMENTS** *S. o. ornatus* ♂ wing 312-360 mm, ♀ 320-405 mm. *S. o. vicarius* ♂ wing 338-349 mm, ♀ 353-388 mm; ♂ tail 244-268 mm, ♀ 266-290 mm; ♂♀ tarsus 87-100 mm. **Weights** *S. o. ornatus* ♂ 835g-1.0 kg (two). *S. o. vicarius* ♂ 964g-1.0 kg (two), ♀ 1.39-1.61 kg (three).

**REFERENCES** Amadon (1982a), Belton (1984), Blake (1977), [Clinton-Fitmeier (1988), Clinton-Fitmeier *et al.* (1991), de la Peña (1992), Doering (1874), Flatten *et al.* (1989, 1990), Haverschmidt (1968), Hilty & Brown (1986), Howell & Webb (1995), Inigo-Elias *et al.* (1987), Klein *et al.* (1988), Lyon & Kuhngk (1985), Madrid *et al.* (1991), Meyer de Schauensee & Phelps (1978), Monteiro & de Mattos (1984), Montenegro *et al.* (1992), Narosky & Yzurieta (1993), Navas & Bó (1991), Pereira (1950b), Ridgely & Gwynne (1989), Robbins & Ridgely (1990), Russell (1964), Sick (1993), Stud (1994), Sules & Skutch (1989), Terborgh (1985), Thiollay (1989b), Trail (1987), Vannini (1989).

## 246 CROWNED HAWK EAGLE

*Stephanoaetus coronatus* (Linnaeus 1766)

Plate 85

Other names: Crowned Eagle, African Crowned Eagle

**DISTRIBUTION** Afrotropical (17°N to 34°S); order 4+; generally local and rare to uncommon or, at best, scarce. Rather patchily in sub-Saharan Africa, but now rare in West: easternmost Sudan and western Ethiopia; southernmost Senegal, Guinea-Bissau, Guinea, Liberia, Ivory Coast, Ghana and southern Togo; southern parts of Nigeria and Cameroon through Gabon, PR Congo and DR Congo, south to northwest Angola, east to parts of Uganda, Kenya and Tanzania, and continuing southeast through Zambia, Malawi and Mozambique to northern and eastern Zimbabwe, and northeastern, eastern and southeastern South Africa, also Swaziland.



**MOVEMENTS** Adults strictly sedentary within home range; immatures more dispersive.

**HABITAT** Typically forest or dense woodland, but also relict patches, wooded escarpments, lakeside and

riverine strips of acacia; in southern Africa even eucalyptus plantations and, in lowland Zimbabwe, quite open wooded areas with baobabs; sometimes forages into adjoining secondary growth or even dry savannah. Sea-level to at least 3,000 m.

**FIELD CHARACTERS** Large and powerful eagle, as adult blackish with variable rufous/cream on breast and barred belly, with strong deep bill, erectile double crest (often not obvious), small pale eyes, thick leathery legs, relatively short but immensely powerful toes, and long vicious talons. Normally perches very upright within canopy; tips of short wings barely exceed basal coverts of longish downward-pointing tail. In dense forest hard to find, but not too difficult in more open brachystegia and waterside acacia: looks formidable from beneath, as it stares down, perhaps with crest part-raised and wings lowered. Sexes rather similar, but differ in underwing pattern (see 'Flight'); female also generally shorter-crested, relatively still longer-tailed, and averages 10% larger and at least 14% heavier; juvenile distinct; not fully adult until sixth year.

**PERCHED Adult** Slate-black above apart from browner head and wing-patches, and boldly marked tail with two grey bands separating two equal black ones and still broader subterminal with thin white tip; dominant patterning below includes cream (more on males) to rufous (more on females), or intermediate tones of rich buff, heavily overlaid with black blotches and some white on breast, bold black barring (heavier on females) on abdomen, and smaller spots on whiter legs. **Juvenile** Very different: pale grey-brown above with obvious white scale-like feather-edges, especially on wing-coverts; tail grey-brown with four dark bars; whole head and underparts pure white, except for sparse grey speckling on nape and legs and, when first out of nest, slight rufous wash on breast; but begins to moult in second half first

year, with black spots beginning to appear on lower tarsi, then black feathers on mantle and rufous ones in area of crop. **Immature** By end first year, some black feathering developed on thighs and crown; during second, head and underparts look increasingly pale rufous, and some dark spots show on breast; during third, becomes browner above, still with pale edges, and generally more like adult but for retained pale rufous on head; not fully adult until fourth or even fifth year. **Bare parts** Adult eyes pale greenish-yellow to yellow, juvenile grey-blue at first, changing through brown, greenish-brown and yellowish-brown during first year, then apparently not turning to greenish-yellow until fourth year. Cere dark grey, above conspicuous gape-flanges that are yellow on juvenile but orange from end of first year. Feet yellow. **FLIGHT** Large raptor with somewhat triangular head (well projecting but not particularly large), short and very broad rounded wings, and longish tail often spread; wingspan 1.9 times total length. Can ascend with fast beats almost vertically from ground to high tree; otherwise, highly manoeuvrable within forest, beats interspersed with glides on flat wings, carpal joints thrust well forward and tips angled back; also glides down from high flight with variably spread or half-closed wings and raised or lowered tail; soars with wings in shallow V with upwept tips. **Adult** Blackish above but for some white or barring on tail-coverts, boldly banded tail, and comparable dark bars and tips on grey-brown flight-feathers with paler windows on primaries. Below, dark head, black-blotched buff to rufous breast, heavily barred abdomen; broadly banded tail with three black bands and two white; rather less bold but still clear pattern on underwings of two dark bands (male) or one (female) and broad blackish trailing edges to secondaries (making totals of three bands and two respectively), whiter-based primaries, and two rows of black spots separating flight-feathers from rufous foreparts of wing-linings; quite unmistakable even on quick impression of heavily barred body and rufous wing-linings. **Juvenile** Flight-feathers and tail comparable to adult in colour tones above and below, but all markings narrower bars rather than bands, with one extra in each case (so that tail has four dark bars, while on underside of secondaries, including relatively thin dark trailing edges, male has total of four bars and female three), and less obvious windows on primaries; otherwise, pale scaly-looking grey-brown back and forewings, largely white head and underbody (against which black-spotted legs can show up) and pale rufous wing-linings. **Immature** Flight-feathers and tail remain as juvenile until well into second year; but much as adult by third when upperparts darkening, and rufous tones and black blotches strengthening on body and underwings.

**CONFUSION SPECIES** Even at considerable distances and whether perched or flying, adult virtually unmistakable on size, shape and colouring. Juvenile likely to be confused only with juvenile Martial Eagle (248), which is longer-winged and shorter-tailed, greyer on crown and nape, less scaled on mantle and wings, plain white on thighs and legs and, in flight, has two-tone underwings with relatively thin and obscure barring on flight-feathers and tail.

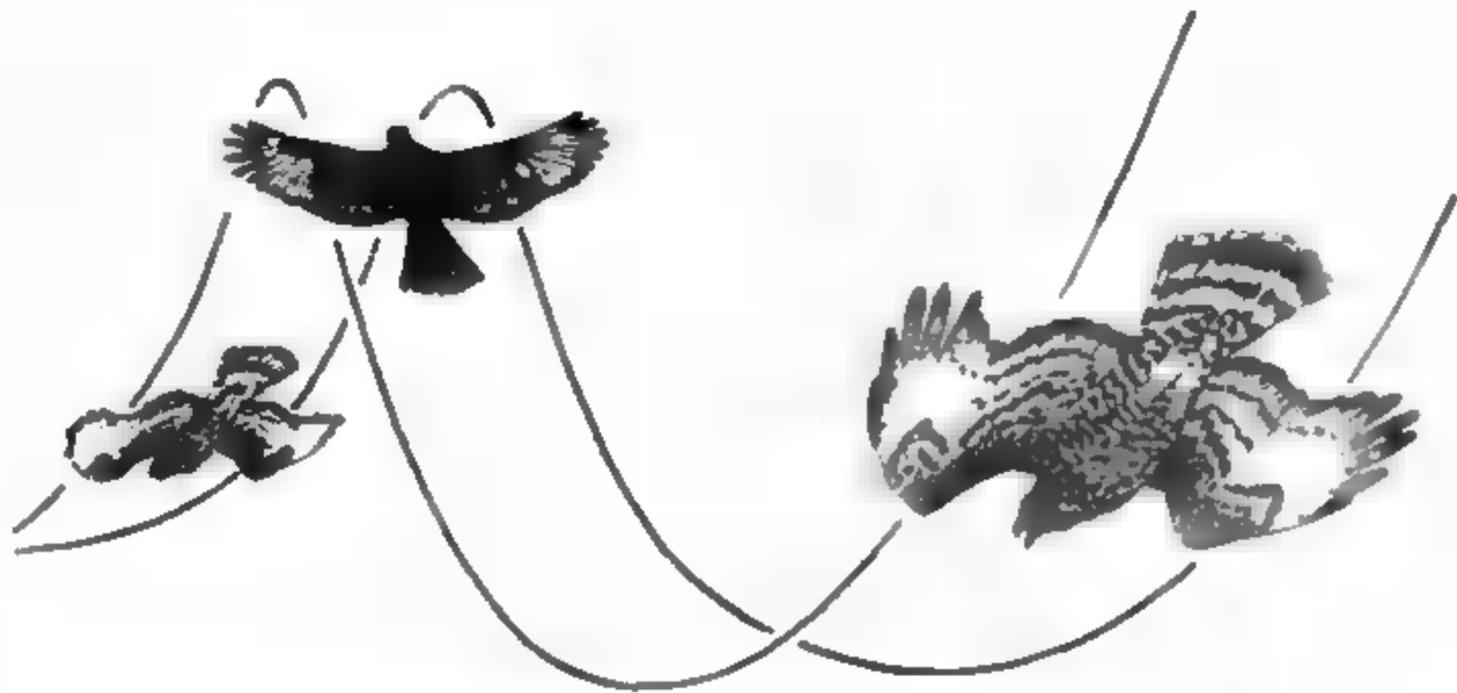
**VOICE** Very noisy; heard year-round in equatorial regions. In display calls, highly evocative of African forests,

shrill *keew-keew-keew...* from male and lower, mellow *koee-koee-koee...* from female, each in series of 20–30. Male approaching with prey elicits shrill *kwere-kwere-kwere...* from female, and young also use this call almost incessantly for long periods.

**FOOD** Mainly mammals, also birds, reptiles; rarely carrion. Mammals especially forest antelopes, hyraxes and mongooses, but including monkeys, bushbabies, genets, domestic cats, squirrels and cane-rats; rarely domestic stock. More bizarrely, at least one report (second-hand?) of human baby being snatched, and others involving piece of skull found in nest and seven-year-old boy attacked; human intruders at nests may also be struck by the eagle's feet. Birds seldom taken in East Africa; apparently more often in Zimbabwe and South Africa, where guinea-fowl, francolins *Francolinus*, pigeons, domestic chickens and turkeys, commercial Ostrich *Struthio camelus* chicks, and nestling herons and storks all recorded. Reptiles include monitors and other large lizards and, at least in Kenya, occasionally snakes. Mainly still-hunts from tree perch, dropping or slanting on to mammals on ground below, but also snatches arboreal monkeys, hyraxes and squirrels in flight, or may knock such victims to ground. Mammal prey often heavier than the eagle and three records have involved antelopes of 10–12 kg, 18–20 kg and about 30 kg, more than two, four and six times as heavy as eagle's highest weight; prey then dismembered on ground and prey cached in trees for eating over several days. Pairs use such cached prey together and may at times hunt co-operatively.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Mutual circling common. Undulating sky-dance, noisily accompanied by main display call (see Voice), particularly spectacular if not, as sometimes, performed so high as to be out of sight from ground; series of unusually long steep dives on closed wings and upward swoops, flapping frantically towards top and almost falling back before beginning next descent; after several undulations with cumulative loss of height, may rise in mid-day thermal and begin again (see fig. 53). Sky-dance often by male alone, sometimes by female, rarely pair together; if female joins undulating male, he may dive at her, whereupon she rolls and presents claws; this may also happen during chases, and sometimes they interlock talons and cartwheel. When bringing food, male may also flap around female at nest, raising wings to flash rufous linings; copulation often follows.

**BREEDING** October–March in West Africa and DR Congo, any month (especially June–January) in East Africa, August–February in Zambia/Zimbabwe, and July–March (especially September–March) in South Africa. Very large stick structure (used year after year and often biggest African eagle nest), at least 1.5 m across and 50 cm deep when new and up to 2.5 m across and 3 m deep after several years, lined with sprays of green leaves; usually in main fork within canopy, but sometimes exposed in dead crown, at 12–40 m in tall forest tree or locally in more open baobab, or even in eucalyptus plantation; also one or two quarry/cliff records. Clutch 1–2. Incubation 48–51 days. Fledging 90–125 days (usually 110–115), males flying c10 days earlier than females. After fledging, single young (smaller sibling always killed by older one) remains with adults



**Fig. 53.** Undulating skydance of Crowded Hawk Eagle *Stephanoetus coronatus* [246]. Series of dives – sometimes steep, sometimes shallow – on closed or part-closed wings, interspersed with upward swoop on spread and, at the top, frantically flapping wings. This is usually performed by the male, sometimes by the female, rarely by both together, and is an example of a fairly typical rollercoaster display, whereas some other raptor species incorporate assorted variations (cf. fig. 51 on p. 760).

for at least 3–9+ months; thus, often pair can breed only in alternate years.

**POPULATION** In optimum areas in Kenya, distance between adjacent pairs may be only 1.5–3.5 km, with home ranges of 10–25 km<sup>2</sup>; in Zimbabwe, pairs averaged 15 km apart; and in three areas of northeastern South Africa, densities of 1 pair/12–68 km<sup>2</sup> were found. Several million km<sup>2</sup> of suitable habitat within the known distribution might suggest a possible population in the tens of thousands, but this species is unaccountably rare or absent in many apparently suitable forest areas, and a figure in the upper thousands seems safer. Suffers through deforestation and, because of its size and reputation, from shooting, trapping and nest-destruction; disturbance also increasing problem. On other hand, welcomed by some foresters who regard it as beneficial in controlling mammals that damage young trees and who, when felling and planting, leave standing clumps around traditional nests. It is far from threatened as yet, though now rare in many parts of West Africa, but

forested reserves may come to play an ever more important part in its long-term future.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 445–490 mm, ♀ 500–532 mm; ♂ tail 300–330 mm, ♀ 325–405 mm; ♂ tarsus 85–94 mm, ♀ 95–103 mm. **Weights** ♂ 2.7–4.12 kg, ♀ 3.18–4.7 kg.

**REFERENCES** Bataamba (1989), Benson & Benson (1975), Britton (1980), Brosset & Erard (1986), Brown (1952, 1953, 1955, 1966, 1970a, 1971, 1972a, 1976b, 1982), Brown *et al.* (1977, 1982), Clark (1970), Danciel (1979), Fannin & Webb (1975), Ginn *et al.* (1989), Grimes (1987), Harwood (1971), Holcroft (1951), Jarvis *et al.* (1980), Kemp (1969), Kemp & Kemp (1998), Lendrum & Lendrum (1984), Lewis & Pomeroy (1989), Mackworth-Præd & Grant (1957–73), Maclean (1993), Muva (1993), Pickford *et al.* (1989), Pinto (1983), Prout-Jones & Kemp (1997), Snelling & Barbour (1969), Stern (1964b, 1982), Sjernstedt (1975), Strubbsaker & Leakey (1990), Tarboton & Allan (1984), Tarboton *et al.* (1987), Thiollay (1985d), Thomsett (1988), Tuet & Tuet (1974), Vernon (1984), Webb (1975), Zimmerman *et al.* (1996).

## 247 ISIDOR'S EAGLE *Oroaetus isidori* (Des Murs, 1845)

**Plate 72**

Other names: Black-and-chestnut Eagle, Isidor's Crested Eagle

**DISTRIBUTION** Neotropical (11°N to 24°S, formerly to 26° 30'S); order 3; extensive but narrow and altitudinally restricted linear distribution, everywhere rare and local. Northwestern South America: from cordilleras of northeast Colombia and northwest Venezuela (Santa Marta, Sierra de Perijá, Cordillera de Mérida, and coastal mountains of Carabobo and Aragua) through Andes of Colombia and Ecuador to extreme northwest Peru (south Piura), thence along eastern side only of Andes in Peru (Cajamarca to Puno), Bolivia (La Paz, Cochabamba, Santa Cruz, Chuquisaca); and north-

west Argentina (Jujuy, formerly also Tucumán).

**MOVEMENTS** Apparently sedentary, apart from any dispersal by juveniles and other immatures.

**HABITAT** Dense and humid montane forest in subtropical and lower temperate zones, sometimes extending down to upper tropical. Typically on undisturbed high east-facing slopes of large valleys where relatively low canopy of oaks and trumpet-trees *Cecropia* and ground broken by ravines and gorges, but not above timberline; more locally in foothills. Some home ranges now have to include a mix of significantly disturbed and partially cleared areas. Recorded at 150–3,400 m, but seldom below 600 m and breeding almost exclusively at 1,800–2,500 m.

slightly duller plumage (obscure brown edges and spots on wing-coverts and belly, slight barring on crissum); occasional juveniles, however, at least in East Africa, are browner over all pale areas. **Bare parts** Adult eyes brown, juvenile grey. Cere blue-grey to yellowish. Adult bare face yellow-orange to red-orange, juvenile yellow. Feet whitish-flesh to dull reddish.

**FLIGHT** Large raptor which, when pressed into flight, or for speed of travel or aerial display, shows unique silhouette: small head far-projecting on longish neck, long broad wings with rounded tips, and diamond-shaped tail which would be exceeded by the toes were it not for the greatly elongated central feathers; wingspan 1.6 times total length. Takes off with short flapping run, and continuing flaps and glides, but once fully airborne can soar stork-like in thermals, occasionally to great heights. **Adult** From below, black flight-feathers contrast markedly with whitish-grey head, body and wing-linings; black thighs and tail markings also obvious. Less contrast on greyer upperparts, but rump black and uppertail-coverts white or barred. **Juvenile** Often difficult to distinguish in flight from adult, except by shorter tail projection, unless brown barring on wing-linings and crissum can be seen.

**CONFUSION SPECIES** Quite unlike any other raptor. Terrestrial existence, long legs and tail, and grey coloration make it more likely to be dismissed, on brief distant view, as bustard or crane (specifically Blue Crane *Anthropoides paradisea* in southern Africa or wintering Demoiselle *A. virgo* in southern Chad and Sudan); similarity to cranes heightened in ground display (see Sociosexual Behaviour). In flight, Lammergeier [53] perhaps closest in shape to brown-morph juvenile (bar central tail-feathers), but jizz and pattern quite different.

**VOICE** Generally silent, but repeated deep croak, or drawn-out hoarse growl, *karrrr-orr*, used in both aerial and ground displays and at nest, as well as in softer version when feeding young. Mewing or whistling described from roosting birds.

**FOOD** Probably mainly large ground insects and small rodents, but eats any small animal prey that it comes across and is able to kill. Among insects, takes especially grasshoppers and beetles. Rodents include many mice, but other mammals comprise hedgehogs, mongooses, squirrels and hares. Other recorded prey range from lizards, snakes, small and young birds, eggs and domestic chickens to amphibians and even freshwater crabs, and small tortoises. Snakes seldom major food, but include puff-adders, cobras and other venomous species. Forages entirely on ground, taking anything it happens to find as it walks; at times runs briefly after something, with part-spread wings; periodically stamps to disturb seen or suspected prey. Most small foods simply taken in bill and, unless too big, swallowed whole in huge gape, but all mobile or dangerous prey killed by stamping first. Stubby-toed feet hopeless for carrying but, by using them to stand on prey, can tear flesh with bill. Snakes may be taken aloft in bill and dropped from height. All food otherwise transported in crop. Large items may be cached under bush. Always strongly attracted to grass fires and burnt ground, where forages for dead insects and other small animals, but apparently does not touch larger carrion.

**SOCIOSEXUAL BEHAVIOUR** Sometimes solitary but more typically in pairs or family parties; larger groups occur at abundant food sources (e.g. recently burnt ground), and congregations of up to about 50, presumably non-breeders, at waterholes in southwestern subdesert areas. Aerial nuptial display impressive because of size of bird and accompanying croaks, but usually involves no more than high soaring by one, or low or high mutual circling by pair. Occasionally one dives at other, which then half-turns and presents claws, or one or both may use shallow undulating sky-dance; these aerial evolutions are, of course, otherwise characteristic of accipitriform hawks and eagles, and are the one behavioural link with them, but in this case sky-dance performed with spread wings. On ground, pairs or small groups may bow by tipping body forward or run around and chase with raised wings, a more crane-like trait. Ground chases, again with wings raised, are also used in repelling intruders, which may then be struck with feet as defender jumps up.

**BREEDING** Active nests possible throughout year from Ethiopia to South Africa, with increasingly clear peak in August–March from Zambia southwards. Nest is large flattened stick structure, 1–2.5 m across but usually not much more than 30–50 cm deep, lined with grass, wool and mammal dung, at 2–36 m (usually 3–7.5 m), typically on top of flat-topped acacia or other thorny tree, locally (South Africa) on isolated pines. Clutch 1–3. Incubation 42–46 days. Fledging very variably 64–106 days (usually c75–90), but can also survive premature departure at 47–50 days; unlike many large raptors, no sibling aggression and two young sometimes reared (at least once, three); post-fledging dependence similarly very variable at 62–105 days. In good conditions, pair may make second breeding attempt less than a month after first completed.

**POPULATION** Home ranges often large: recorded densities vary greatly from 1 pair/20 km<sup>2</sup> to 1 pair/230 km<sup>2</sup>, with distances between nests of 4.5–15 km; but these data come mostly from optimum areas in southern Africa, and elsewhere often much scarcer, even 1 pair/500 km<sup>2</sup> in more arid regions or in low-rainfall years. Estimated 1,000+ pairs in northeastern South Africa (former Transvaal). Despite total distribution of over 15 million km<sup>2</sup>, population above five figures unlikely. Although benefiting from bush clearance and deforestation, and adapting readily to large-scale ranching and farming, with resulting local increases, generally considered to be declining in face of ever-growing human population and consequent spreading cultivation and urbanisation. Little persecuted, but vulnerable to disturbance.

**GEOGRAPHICAL VARIATION** Usually treated as monotypic, though West African population sometimes distinguished as *gambiensis*.

**MEASUREMENTS** ♂ wing 630–675 mm, ♀ 610–660 mm; ♂ tail 670–854 mm, ♀ 570–705 mm; ♂♀ tarsus 278–342 mm. **Weights** unsexed 2.3–4.27 kg.

**REFERENCES** Åkesson (1991), Barnard & Simmons (1985), Benirschke (1977), Benson & Benson (1975), Biggs *et al.* (1979), Brooke & Hodgson (1971), Britton (1980), Brothers (1975), Brown (1952, 1953, 1955), Brown *et al.* (1982), Colahan & Ferreira (1992), Cracraft (1981), Day (1984), De

Swardt (1990), Feduccia & Vothreis (1989), French-Constant (1985), Fry (1977), Ginn *et al.* (1989), Gore (1990), Grimes (1987), Haagner (1913), Hartley (1992), Hendry (1960), Karmali & Karmali (1968), Kemp (1985, 1994, 1995), Kemp & Kemp (1998), Kemp & Kemp (1978), Mackworth-Praed & Grant (1957-73), Maclean (1993), Miller (1947), Mundy

(1988), Newman (1970), Pickford *et al.* (1989), Pinto (1983), Read (1987), Renshaw (1917), Roberts (1940), Searle (1992), Simmons (1988b), Smeenk (1974), Spawls (1986), Steyn (1961a/b, 1982), Steyn & Myburgh (1991), Tarboton & Allan (1984), Tarboton *et al.* (1987), van der Heiden (1992), van Someren (1956), Wolff (1978), Zimmerman *et al.* (1996).

## ORDER FALCONIFORMES

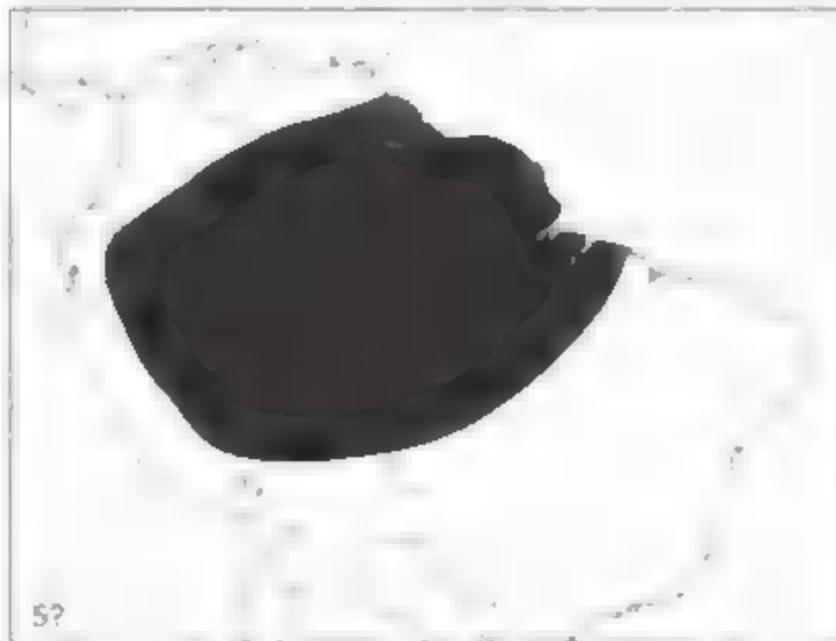
### Family Daptriidae (caracaras)

#### 250 BLACK CARACARA *Daptrius ater* Vieillot, 1816

Plate 88

Other name: Yellow-throated Caracara

**DISTRIBUTION** Neotropical (10°N to 16°S); order 5; fairly common to locally common. Northern South America east of Andes: east Colombia (south from Norte de Santander), mainly southern Venezuela (south from Zulia, Sucre and Monagas) and Guianas, through tropical east Ecuador and Peru and northern and western Brazil (Amazonia south to Mato Grosso and north Maranhão), into northeast Bolivia (Pando, Beni, La Paz, Cochabamba, Santa Cruz).



**MOVEMENTS** Perhaps somewhat nomadic.

**HABITAT** Lowland forest edges and clearings, especially by larger rivers with exposed banks and sandbars, including mangroves, galleries and secondary growth; also wanders through lightly wooded savannah and recently burnt areas. Sea-level to 600 m.

**FIELD CHARACTERS** Small slim caracara, in all plumages largely black apart from bare face and some white at tail-base, with weak bill little hooked, longish wings, medium-length tail and short legs. Not shy; perches both in open high on tree tops and within canopy, sometimes lower down, and also often settles on ground, especially on river banks and sandbars; wing-tips about half down tail. Sexes similar and virtually no difference in size, though female may tend to be heavier; juvenile also fairly similar but distinguishable; apparently as adult after first complete moult.

**PERCHED Adult** All glossy black but for white tail-base, looking like white band, and bare orange face. **Juvenile** Much as adult, but black less glossy, tail with four to five incomplete whitish bars on basal two-thirds instead of solid white base, and underbody with obscure buff tips and bars which tend to abrade; face also duller yellow. **Bare parts** Adult eyes red-brown, juvenile brown. Adult cere and bare facial skin bright orange, shading to yellow on throat; juvenile dull lemon-yellow. Adult legs light yellow-orange, juvenile paler orange-yellow.

**FLIGHT** Smallish slim caracara with rather long narrow wings and broad, slightly rounded tail of medium length; wingspan 2.2 times total length. Almost continuous flapping, with slow deep beats, or also short glides; rarely, if ever, soars. 'Looks like a black harrier' (B&A). **Adult** All black, apart from orange face (which may simply look pale in poor light) and orange legs, latter partly covering white tail-base below. **Juvenile** Similar, but distinguished by whitish barring on proximal half of tail, instead of solid basal band; duller plumage, with buff tips on underbody, and yellower face and legs not obvious except in optimum conditions.

**CONFUSION SPECIES** Red-throated Caracara [251] roughly similar, but larger, broader-winged, longer-tailed, and usually much noisier, with red face and all-black tail but white belly, crissum and thighs. Consider also curassows (Cuculidae).

**VOICE** Less noisy than Red-throated Caracara [251], but calls at intervals when perched and frequently in flight. 'A harsh, scratchy scream, *kra-a-a-a-a-a-a*, descending somewhat, hoarser than respective call of Yellow-headed Caracara [257]; in flight similar harsh screams, *cheeow*, *cheo-cho-cho*' (Hilty & Brown). Long shrill wailing *eeeeeeah*, 'like the creaking of a rusty gate', and 'hoarse raven-like croaks' are perhaps different renderings of same calls.

**FOOD** General scavenger, taking wide variety of mostly static foods, including carrion in form of small mammals, birds and fish; also birds' eggs, nestlings, lizards, frogs, many arthropods and, like very few other raptors, fruits. Arthropods include beetles, dragonflies, ants, dipterous and lepidopterous larvae, and ticks picked from mammals. Palm fruits (*Desmoncus* and *Mauritia*) found in dense masses in several gizzards.

**SOCIOSEXUAL BEHAVIOUR** Often solitary or in pairs, sometimes family parties of 3–4, occasionally combined groups of up to 7–8. Rarely, if ever, soars and no description of aerial displays.

**BREEDING** Said to nest (= building/laying?) in Guyana in March–June, which may be compared with female in breeding condition shot in Colombia in early August and nestling just fledged in Surinam in December. Nest not described, but said to be high in tall tree. Clutch 2–3. Incubation and fledging periods not recorded.

**POPULATION** Distribution spread over 6.5 million km<sup>2</sup>, but species usually absent from unbroken dense forest and, elsewhere, sometimes from apparently suitable

habitat. Generally regarded as fairly common, but surprisingly little known. Suggested five-figure population may be too low.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 299–318 mm, ♀ 297–324 mm; ♂♀ tail 184–203 mm, tarsus 54–60 mm. **Weights** ♂ 330 g (one), ♀ 348–445 g (two).

**REFERENCES** Blake (1977), Davis *et al.* (1994), Dubs (1992), Friedmann & Smith (1950), Haverschmidt (1962, 1968), Hilty & Brown (1986), Meyer de Schauensee & Phelps (1978), Remsen & Traylor (1989), Snyder (1966), Thuollay (1985a, 1985b), Tostain *et al.* (1992), Traylor (1958), Vrous (1969), Vuilleumier (1970).

## 251 RED-THROATED CARACARA

*Daptrius americanus* (Boddaert, 1783)

Plate 88

**DISTRIBUTION** Neotropical (11°N, formerly 17°N, to 21–22°S); order 6?; usually uncommon to common, with wide distribution, but now extinct in most of Middle America and rare everywhere west of Andes after drastic decline since 1960s/70s. Central America and tropical South America: formerly extreme southeast Mexico (south Veracruz, north Oaxaca, south Chiapas, where still present in 1970s), south Guatemala and north Honduras and Nicaragua, and along both slopes of Costa Rica and Panama; now apparently extinct everywhere northwest of southern Costa Rica (and even there regular only in Golfo Dulce lowlands), rare in Panama, and thence west of Andes greatly reduced and possibly extinct on Pacific slope of west Colombia and Ecuador; uncommon also in north Colombia, but more numerous in southeast Colombia, parts of Venezuela (south from Zulia and Monagas) and Guianas, through tropical east Ecuador, east Peru, northeast Bolivia (Pando, Beni, La Paz, Santa Cruz) and much of Brazil (south to northwest Paraná and São Paulo).



**MOVEMENTS** Perhaps mainly sedentary; group in French Guiana defended territory year-round.

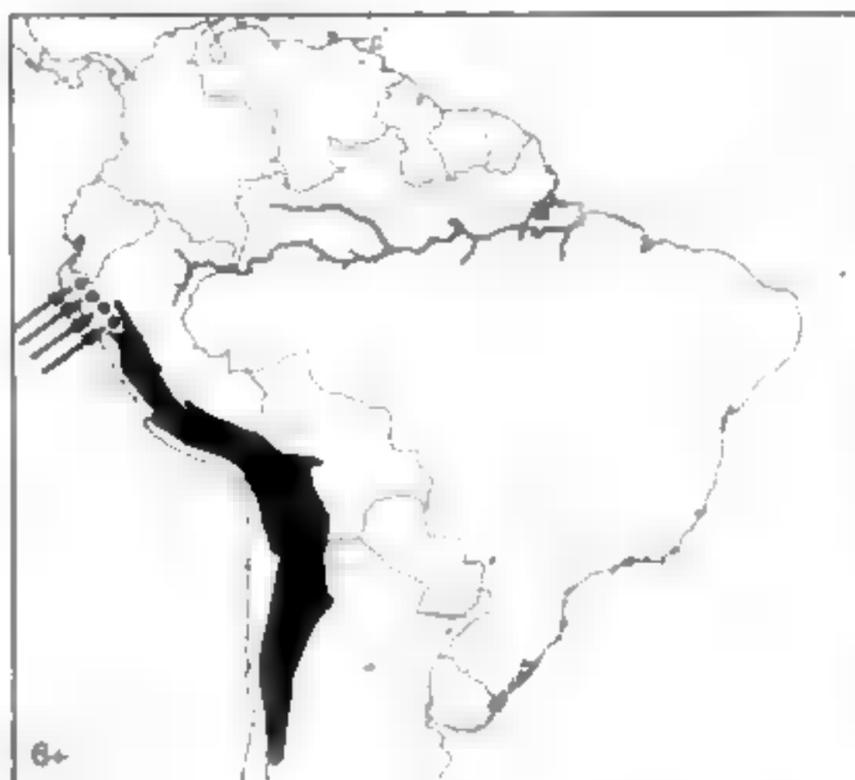
**HABITAT** Humid primary tropical and lower subtropical forest in lowlands and foothills, particularly at edges (including along rivers) and in more open areas

where good understorey present; also in adjacent plantations and other secondary growth if not seriously disturbed; locally in dry deciduous woodland, also in tangled vegetation and stunted trees of Brazilian cerrado. Sea-level to 1,500 m.

**FIELD CHARACTERS** Largish and slim but gawky caracara, in all plumages mainly black apart from partially bare face and white lower abdomen, with small head, bushy crown, weakly hooked chicken-like bill, relatively longish neck, longish wings, rather long and broad tail, and short legs. Not shy; perches high in trees, but foraging groups work through understorey as well as canopy; sometimes settles on ground; wing-tips about half down tail. Sexes similar and virtually no difference in size, though female averages 2–3% larger and probably a little heavier; juvenile also very similar and often almost indistinguishable in field; apparently as adult after first complete moult.

**PERCHED Adult** Mostly glossy black with contrasting white belly, thigh and undertail-coverts, but also greyish-streaked cheeks behind more or less bare red lores and throat. **Juvenile** Very much as adult, but less gloss, fewer and greyer streaks on cheeks, duller face with more extensive feathering. **Bare parts** Adult eyes red-brown to red, juvenile brown. Cere blue-grey behind yellow-horn bill. Adult facial skin red, juvenile duller orange-yellow. Adult legs orange-red, juvenile paler yellow-red. **FLIGHT** Largish heavy-looking caracara with small head, and rather long, broad and slightly rounded wings and tail; wingspan 2.2 times total length. Slow laboured beats, occasional short glides; does not soar, and indeed seldom flies much above trees except, say, to cross valley. **Adult/Juvenile** Black, with white belly and thighs, red on face, throat and legs. (Differences in degrees of gloss and colours of bare parts difficult to see in field unless direct comparison possible in optimum conditions.)

**CONFUSION SPECIES** Black Caracara [250] roughly similar, but clearly smaller, narrower-winged and shorter-tailed, with more obvious orange face and all-black abdomen, white markings being confined to base of tail. Several species of curassows (Cuculidae) are black with white belly and undertail-coverts, and this caracara's superficially guan-like appearance is increased by its



of Neuquén, has been recorded as Darwin's Caracara [254] (M Christie), but Fjeldså & Krabbe gave Nahuel Huapi as the southern limit for Mountain Caracara: it may be that the two species almost overlap there, possibly replacing each other at different altitudes and in slightly different habitats.

**MOVEMENTS** Probably mainly sedentary, but many must travel considerable distances to special food sources, and some evidence of altitudinal wandering outside breeding season.

**HABITAT** Extends to outposts of the páramo in north Peru near the Ecuador border (cf. Carunculated Caracara [252]), but much commoner at similar altitudes in the equally high but drier puna from central Peru southwards, feeding on open grassland, often in heavily grazed areas, as well as on fresh plough and young crops, and especially near marshes and lakes, while nesting and roosting on crags and cliffs in more broken country. Mostly at 3,000–5,000 m, but said to occur up to highest peaks at 7,000 m; more locally, much lower, not uncommonly to 2,000 m, sometimes to 750–1,000 m, and feeding regularly down to Pacific coast in south Peru.

**FIELD CHARACTERS** Largish slim caracara, as adult mainly black apart from partially bare face and all-white lower abdomen, with curly crown forming inconspicuous cap-like crest, weak legs and bill (latter only slightly hooked), longish wings, and rather long rounded tail. Seen mainly walking on ground, but regularly uses fences and other available perches, as well as cliff ledges for roosting; wing-tips reach white of tail-tip. Sexes similar and, though recorded measurements show female averaging 5% larger, much overlap in size; juvenile distinct; plumage variations indicate that there may be little change by second year, and that bird may not be fully adult until late in third year.

**PERCHED Adult** Mainly black with slight gloss, including throat and breast, giving good contrast to white lower breast, flanks, belly, thighs and crissum, as well as white tips to flight-feathers, white uppertail-coverts and noticeable white-ended tail; bare orange-red face not wrinkled and sides of throat more feathered (cf. Carunculated [252]). **Juvenile** Largely dark rufous-brown with black shaft-streaks and, especially in fresh plumage, pale

tips which often most conspicuous on thighs and belly, where they form obscure whitish barring; contrasting pale creamy-buff uppertail-coverts, thinly darker-banded, and whitish to dusky skin of face and legs. **Immatures** Second year probably similar to juvenile but for yellowing cere and legs, paler head, white spotting on breast, and creamy tips to flight-feathers; third year much like adult but with some brown feathers retained, thin dark barring on white uppertail-coverts, and duller whiter underbody. **Bare parts** Eyes brown. Adult facial skin and cere orange-red behind bluish bill with yellow tip; juvenile bluish-white, turning darker and then yellow. Adult legs orange; juvenile bluish-white and then pale yellow. **FLIGHT** Largish caracara with long wings narrowing at clearly fingered tips, and longish rounded tail; wingspan 2.3 times total length. Relatively fast, stiff, shallow beats, interspersed with glides on flat wings; sails on half-closed wings and often soars; often reluctant to take wing and, when disturbed, flies away low. **Adult** Mainly black, with sharply contrasting white wing-linings and bases to primaries, white rump, belly, thighs and crissum, and broadly white-tipped tail. **Juvenile** Mainly dark brown, more or less obscurely buff-mottled, with contrasting whitish-buff rump, more cinnamon band across primaries, and cinnamon to buff tips and underside to tail.

**CONFUSION SPECIES** Adult unmistakable but, in north and south of range respectively, juvenile might have to be distinguished from juvenile Carunculated Caracara [252] (generally paler, with tawnier crown, more buff rump, underside paler and more rufous-brown than upperside, more whitish-buff band across bases of primaries) and from juvenile Darwin's Caracara [254] (darker, looking almost blackish above, with still blacker forehead and ear-coverts), while possibility of hybridisation with latter might need to be considered (see Geographical Variation). See also Chimango Caracara [258] (smaller, paler, with feathered face, weaker and more chicken-like bill, far less fingered wing-tips) and Crested Caracara [256] (larger, heavier, longer-legged and much stronger-billed, with dark cap, streaked underparts and clearly barred tail).

**VOICE** Usually silent. 'Series of rasping, barked *kyah* or *ahh* calls' (Fjeldså & Krabbe). Cackling call (of alarm?) sometimes uttered in flight (M Pearman).

**FOOD** General scavenger, taking large insects and other invertebrates, young of birds and small mammals, and carrion and other garbage. Forages almost entirely on foot, scratching and stamping to disturb prey items; frequently seen at rubbish dumps and near houses, picking over refuse. In Bolivia, however, learnt to fly after cars to catch bits of food thrown out. Comes to roadkills and occasionally to large carcasses with cathartid vultures.

**SOCIOSEXUAL BEHAVIOUR** Sometimes solitary or in pairs, perhaps with accompanying juvenile, but often tens or even hundreds on newly ploughed fields and comparable concentrations near rubbish dumps; also roosts socially. No aerial displays described apart from high-circling and other soaring.

**BREEDING** October–December onwards in south, probably to March–April. Nest on ledge of high crag or small rocky outcrop, or sometimes on concrete electricity tower or similar edifice, may be anything from

little more than scrape to fairly substantial structure, perhaps 20 cm tall, of twigs or sticks interwoven with wool. Clutch 2 (2-3). Incubation and fledging not recorded.

**POPULATION** With basically linear distribution of some 4,500 km from north to south, but also up to 500 km from west to east, this species is found over extensive area in which it is often common, even abundant. A population in high hundreds of thousands is assumed, but it may be into seven figures. In no way threatened.

**GEOGRAPHICAL VARIATION** Monotypic. Both Carunculated Caracara [252] and Darwin's Caracara [254] sometimes treated as races of this species, and possible

hybrids between Mountain and Darwin's have been claimed, but no evidence of intermediates in museums, and little overlap in altitudinal range. Now more usual to treat all three as allopecies forming a superspecies, within which the more different but still closely related Forster's Caracara [255] is sometimes also placed.

**MEASUREMENTS** ♂ wing 361-405 mm, ♀ 391-415 mm; ♂♀ tail 198-225 mm, tarsus 78-83 mm. **Weights** ♂ 795 g (one).

**REFERENCES** Amadon (1964), Blake (1977), Christie (1984), de la Peña (1992), Fjeldså & Krabbe (1990), Housse (1938), Jaksic & Jiménez (1986), Johnson (1965), Narosky & Yurrieta (1993), Niehammer (1953), Parker *et al.* (1985), Remsen & Traylor (1989), Vuilleumier (1970), White & Bowe (1987).

## 254 DARWIN'S CARACARA *Phalcoboenus albogularis* Gould, 1837

Plate 86

Other name: White-throated Caracara

**DISTRIBUTION** Neotropical (37°S to 55°S); order 57; uncommon to, perhaps only very locally, common. Southern South America: endemic to southern Andean regions of both Chile (south from Aisen, though formerly north also to Nuble) and Argentina (south from southwest Neuquén, including Parque Nacional Nahuel Huapi (M Christie), and west Rio Negro), extending to coasts in Tierra del Fuego and Chile's southern provinces of Aisen and Magallanes. See note on Nahuel Huapi under Mountain Caracara [253].



**MOVEMENTS** Probably somewhat nomadic, but inadequately known.

**HABITAT** Lower mountain slopes and foothills, including edges of rocky basalt plateaux in Patagonia and down to sea in south, but, unlike congeners, also distinctly associated with forest (southern beech *Nothofagus*), open woodland, and dense low scrub country. Various sea-level to 3,000 m.

**FIELD CHARACTERS** Largish slim caracara, as adult contrastingly black and white, with curly crown forming inconspicuous cap-like crest, weak legs and bill (latter only slightly hooked), longish wings, and rather long rounded tail. Often shier than congeners; walks on ground, perches on fences, rocks and trees; wing-tips

reach white of tail-tip. Sexes similar and, though recorded measurements show female averaging 3% larger, much overlap in size; juvenile distinct; plumage variations indicate that there may be little change by second year, and that bird may not be fully adult until late in third year or even fourth.

**PERCHED Adult** All brownish-black to black above, with little gloss, apart from white tips to flight-feathers, white uppertail-coverts and broadly white-ended tail; and all white below, and all white below, apart from solid extensions of the black of the mantle on to sides of chest which are lacking in younger adults (M Pearman); face less bare than those of congeners farther north, and much yellower (cf. Carunculated and Mountain [252, 253]). **Juvenile** Very like juvenile Mountain Caracara, but dark brown above, palest on head with contrasting dark smudge behind eyes; again, contrasting pale creamy-buff uppertail-coverts and whitish to dusky skin of face and legs. **Immature** Head becomes tawny and underparts striated brown and white; then white spots on flanks and breast, and tail blacker subterminally behind creamy tips (M Pearman), but not clear whether this represents one or two immatures stages after juvenile. **Third-year?** Like adult, but off-white below, with dusky spots, rather variable in extent, on flanks and sometimes chest-sides (which later become solid black extensions (see 'Adult')). **Bare parts** Eyes hazel to brown. Adult facial skin and cere yellow to orange behind bluish bill with yellow tip; juvenile bluish-white, turning darker and then, presumably, yellow. Adult legs yellow; juvenile bluish-white and then pale yellow.

**FLIGHT** Largish caracara with long wings narrowing at clearly fingered tips, and longish rounded tail; wingspan 2.2 times total length. Action probably much as that of Mountain Caracara [253], though perhaps more readily takes wing. **Adult** Black above with white rump and tail-end, and white tips to all but outermost flight-feathers; and extensively white below, from chin to crissum and wing-linings, apart from black extension from upperparts on to sides of chest, plus white-barred bases to inner primaries, all contrasting with otherwise mainly black flight-feathers and tail, but dusky spots may be visible on flanks. **Juvenile/immature** Dark brown above

with paler head and dusky smudge behind eyes, cinnamon band across primaries, contrasting whitish-buff rump; tinged rufous below, underside of tail cinnamon; see 'Perched' for later stages. **Third-year?** As adult, but creamy rump, off-white underparts, dusky spots on flanks and sometimes at sides of chest.

**CONFUSION SPECIES** Adult unmistakable but, in area of geographical overlap in Argentina – in Neuquén, though generally at different altitudes and in rather different habitats – juvenile may need to be distinguished from juvenile Mountain Caracara [253] (generally paler and browner, without black on forehead or ear-coverts); possibility of hybrids should also be borne in mind (see Geographical Variation under Mountain Caracara). See also Chimango Caracara [258] (smaller, much paler, with feathered face, weaker and more chicken-like bill, far less fingered wing-tips, large windows on base of primaries) and Crested Caracara [256] (larger, heavier, longer-legged and much stronger-billed, with dark cap, streaked underparts and clearly barred tail).

**VOICE** 'The call is said to be a deeper version of that of Chimango [258]', but latter has variety of far more peevish whinings than present species' congeners.

**FOOD** Little known, but evidently general scavenger like congeners, though probably forages more on wing; recorded at carcasses with cathartid vultures. In Tierra del Fuego it concentrates at places where sheep slaughtered and, often in company with Crested and Chimango Caracaras [256, 258], on rubbish dumps: it is then bold

and will take on both for carrion pieces (M Pearman).

**SOCIOSEXUAL BEHAVIOUR** Sometimes solitary or in pairs, but concentrations at abundant food sources. No aerial displays described.

**BREEDING** Few data. Eggs probably laid in October–November. Stick nest on rock ledge. Clutch, incubation and fledging not recorded.

**POPULATION** In linear terms, species has distribution of comparable size to that of Mountain Caracara [253], extending over some 4,500 km, but limits of range enclose probably less than 0.5 million km<sup>2</sup> and density appears to be much lower. Indeed, generally scarce in Argentina (except at rubbish dumps near Ushuaia, Tierra del Fuego), if commoner in southern Chile. Therefore, perhaps unlikely that total population exceeds five figures. Species surprisingly little known, but no evidence of persecution or serious habitat damage.

**GEOGRAPHICAL VARIATION** Monotypic. Sometimes treated as race of Mountain Caracara [253] (which see for discussion), but more usually considered to form a superspecies with it and Carunculated [252], and possibly also including Forster's [255].

**MEASUREMENTS** ♂ wing 365–382 mm, ♀ 372–395 mm; ♂♀ tail 214–235 mm, tarsus 78–81 mm. **Weights** No data.

**REFERENCES** Amadon (1964), Blake (1977), Clark (1986), de La Peña (1992), Fjeltå & Krabbe (1990), Goodall *et al.* (1957), Humphrey *et al.* (1970), Jaksic & Jiménez (1986), Johnson (1965, 1972), Vuilleumier (1970).

## 255 FORSTER'S CARACARA

*Phalcoboenus australis* (Gmelin, 1788)

Plate 86

Other names: Striated Caracara, Austral Caracara, Johnny Rook

**DISTRIBUTION** Neotropical (51°S to 56°S); order 4+; locally common throughout restricted range, but formerly more widespread and far more numerous; some recovery on outlying islands after cessation of persecution, but no recent evidence that any increase is continuing. Atlantic region of southernmost South America; endemic to Falklands [Islas Malvinas] and islands off both Chilean and Argentine coasts of Tierra

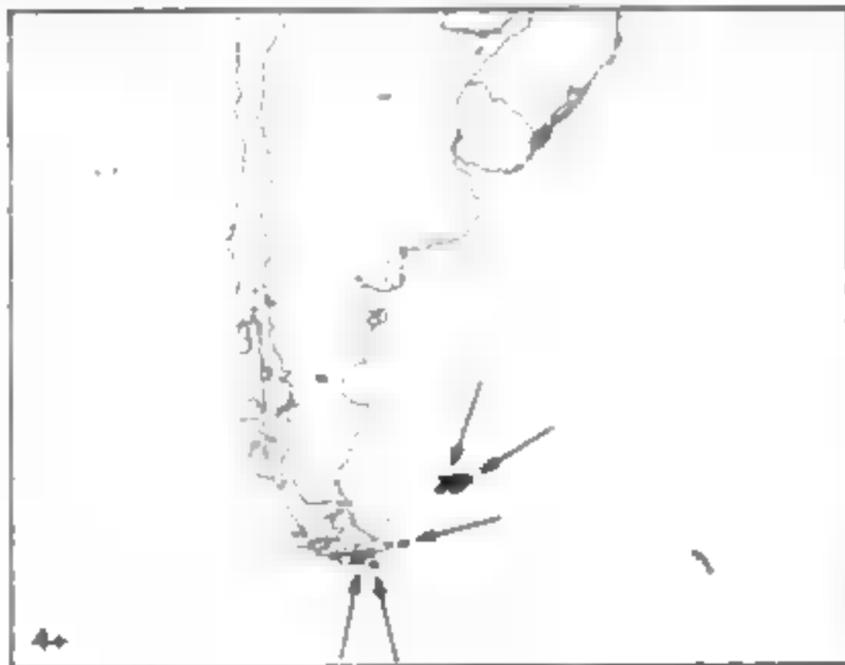
del Fuego, including Isla de los Estados [Staten Island] and those south of Beagle Channel (including Navarino, southern Hoste, Wollaston group), as well as Peninsula Mitre at southeast corner of Isla Grande itself.

**MOVEMENTS** Largely sedentary, but may be only winter visitor to shores immediately south of Beagle Channel and at least wanders to south and east coasts of Tierra del Fuego, north to 54°S.

**HABITAT** Rocky coasts, adjacent tussock-grass lowlands and coastal mountain slopes, extending locally into forested areas. Sea-level to, perhaps, 500 m.

**FIELD CHARACTERS** Large and rather stocky caracara, mainly blackish in all plumages but also pale-streaked and rufous-bellied as adult, with bristly forehead, longish wings and tail and, compared with congeners, stronger bill and legs. Generally tame and inquisitive; walks or runs on ground, perches on rocks, posts, fences; wing-tips near tail-tip. Sexes similar and, though recorded measurements show female averaging 3% larger, much overlap in size; juvenile distinct: often stated to take five years to reach maturity, but this may be due to misinterpretation of individual variation and, apart from juvenile, only one other clear immature stage discernible.

**PERCHED Adult** Mainly brownish-black, darkest on head, back, wings and tail, with white to buff or cinnamon shaft-streaks forming nuchal collar and, from being



Other names: Common Caracara, Carancho, Mexican Eagle

**DISTRIBUTION** South Nearctic and Neotropical (34°N to 55°S); order 6; wide distribution, tropical to cold-temperate, in which varies greatly from rare to common, though often at best uncommon to fairly common and rather local. Southernmost USA, Mexico, and Central and South America, and some Caribbean and southern islands: from central Arizona (rare), south Texas, southwest Louisiana and central Florida (fairly common), through Mexico (except central-northern states and all but northwest of Yucatán Peninsula, but including southern Baja California and, in Islas Tres Marias, María Madre) and all countries of Central America except, probably, Belize (though local in much of Guatemala, and mainly on Pacific slope of Honduras, Costa Rica and Panama); widespread in South America (mainly to north and south of Amazonia, and missing from Colombian Pacific lowlands, southern coastal Peru, and higher Andes), extending down to Tierra del Fuego, Isla de los Estados [Staten Island], islands adjacent to Beagle Channel, and Falklands [Islas Malvinas]; also, in Caribbean region, Cuba and satellite Isle of Pines, and islands of Dutch Lesser Antilles off Venezuela (at least Aruba, Curaçao and Bonaire), though only vagrant to Trinidad.



**MOVEMENTS** Sedentary and nomadic, wandering into New Mexico and other adjacent states of southern USA or, farther south, into felled forest, treeless uplands, offshore islands (e.g. Trinidad, and Panama's Archipiélago de las Perlas), and other newly available or non-breeding habitats; becomes seasonally common in some areas of South America, especially after river floods.

**HABITAT** Wide variety of mainly open and semi-open country, typically in lowlands but, with deforestation and spread of human activities, increasingly in mountainous areas. Often commonest in cattle-ranchland with scattered trees, shelterbelts and small woods, but also in agricultural land, prairie, savannah, coastal trees and coconut plantations, beaches, scrub, bushy Patagonian steppe, sheep-grazed foothills and uplands, seasonally flooded grasslands, marshes, at times even in broken forest; often along roads. Sea-level to 2,000 m, occasionally to 3,000 m; has been recorded at 5,800 m.

**FIELD CHARACTERS** Largest caracara, boldly blackish and dark-banded white as adult, with deep pale bill, large head, bare face, flat crown slightly crested at rear, and longish neck, wings, tail and legs. Usually cautious and reluctant to allow close approach; walks and runs rather upright on ground; squats on tarsi with head up and tail spread; perches openly on posts, fences and, often, very tops of trees; wing-tips near tail-tip. Sexes similar and, though female averages 4% larger, at least in South America, and perhaps 14% heavier in Panama, much overlap in size; juvenile distinct; some breeding birds are much browner than others, although streaking already replaced by bars (see below), so perhaps not fully adult until after second year (but blacks do also fade somewhat browner in full adults).

**PERCHED Adult** Black crown forming distinct crested cap above large pale bill, bare orange-yellow to red face and white (in north) to buff (in south) throat and cheeks; same variable pale ground colour barred with blackish on nape, mantle, breast and chest (last more spotted in north); lower back and wings blackish-brown, belly and thighs solid black or dark brown in contrast to crissum plain white (in north) or boldly black-banded (in south); tail mainly white with many narrow blackish bars and broad terminal band. **Juvenile** Roughly similar, but blacks replaced by browns, whites by dirty buffs, bars by brown streaks; crown brown, face grey to pink, throat and neck more buff, mantle and breast streaked with brown, back and wings brown with whitish tips, and belly also browner with whitish shaft-streaks. **Second-year?** Pattern as adult, with barred nape, mantle and chest, but browner, notably on crown and back. **Bare parts** Eyes variously pale yellow-brown, or even yellow, to brown (variation due to geography or age?). Adult facial skin and cere orange to pinkish-red (but turning bright yellow in excitement) behind whitish-horn bill with more leaden base; juvenile whitish-grey to pink. Adult legs yellow to orange-yellow or reddish; juvenile yellowish-grey to pink or dull yellow.

**FLIGHT** Fairly large raptor with deep bill, noticeably projecting head on rather long neck, longish wings with straight parallel edges and clearly fingered tips, and longish squared or slightly rounded tail; wingspan 2.1 times total length. Flight direct or erratic with steady, rather stiff and, for caracara, relatively deep beats mixed with short glides; glides on slightly arched wings, wrists raised and slightly forward, hands pointing slightly back and down; soars eagle-like with projecting head and

straight flat wings with clearly fingered tips. **Adult** Black cap, coloured face and pale bill conspicuous above buff to white throat and cheeks; otherwise largely blackish-brown with blacker wing-linings, belly and, more variably, mid-back, in contrast to more or less black-banded white hindneck, mantle, chest, primary-windows and all except end of tail (windows and tail-base conspicuous above and below, latter also emphasised by buff to white uppertail-coverts and crissum). **Juvenile** Clearly browner, with adult's whites or pale buffs replaced by dingier buffs, and grey to pink face, but pattern much the same, except for streaked nape, mantle and chest and whitish-spotted wing-coverts and belly, so hardly less distinctive with comparable heavy bill, dark (brown) cap, and wing-windows and tail.

**CONFUSION SPECIES** Almost unmistakable. Wing-windows and barred tail with terminal band give some similarity in flight pattern, from above only, to Chimango Caracara [258] in southern South America and, to lesser extent, juvenile Yellow-headed Caracara [257] in north, but both are clearly much smaller, punier and less contrasted, with little bills and weak flight. Other caracaras all quite different. See also juvenile Lesser Black Hawk [177] because of windows and tail pattern, again from above, and Black Vulture [1] because of blackness and pale primaries (but both are very different in shape, behaviour and all other characters).

**VOICE** Generally silent except when breeding, though sometimes harsh squawk if disturbed at carcass. Loud grating *knk* or *knck*, repeated singly at intervals, characteristic when human intruder near nest. Harsh creaking, cackling or rattling *kik-kik-kik-kik-kerrr*, with last syllable drawn out, accompanies head-tossing (South American Indian rendering of this call became 'caracara'). Shrill screaming *kerrr* in soaring and aerial skirmishes.

**FOOD** General scavenger. Mainly carrion and other more or less immobile prey: nest contents and slow-moving, injured, incapacitated or young birds, rodents, reptiles, amphibians and fish, as well as invertebrates; at least locally, in Surinam and Guyana, has learnt to feed on coconut flesh both during harvest and when dried as copra. Carrion varies from large carcasses (where also feeds on maggots), dead penguins and small roadkills to stranded fish. Specimen from Rio Negro, Argentina, had stomach full of parts of cavies *Cavia*: *Microcavia* (M Pearman), which may suggest that these were caught alive. In Falklands, will attack 'fallen sheep and probably kills lambs' (Woods). Reptile prey includes small freshwater turtles and their eggs, lizards and snakes. Nests robbed range from those of large colonial birds to small passerines. Among invertebrates, lepidopterous caterpillars, various other larvae, beetles, worms, shellfish. Frequently forages on foot, turning over fallen branches or cow dung, searching in cover, scratching the earth, even peering under vegetation in shallow water; but also rather randomly on wing, sailing and circling at no great altitude, thus often reaching carcasses before cathartid vultures aloft. Well able to drive single vultures from small carcasses; also pirates food from them and from buteos, as well as from Brown Pelicans *Pelecanus occidentalis* and ibises and spoonbills (Threskiornithidae), chasing and harrying until they

regurgitate or drop food. Up to ten seen waiting at edge of colony of Chilean Flamingos *Phoenicopterus chilensis* (which had mainly small young at the time) for hours on several different days (IJF-L). Locally has learnt to follow trains or cars for food thrown out. Carries prey in bill or foot, sometimes for considerable distances; in Falklands, remains of hare *Lepus* found in nest on Kidney Island must have been carried at least 800 m from East Falkland itself.

**SOCIOSEXUAL BEHAVIOUR** Often solitary or in pairs, or family parties of 3-4, but communal roosts of 5-10+ not uncommon, while similar numbers readily gather at carcasses and up to 75 at abundant food sources. Occasional soaring usually of limited duration and not particularly high. Only other aerial display recorded is skirmishing or mock-fighting (between rivals or pairs?), each swooping at the other. Two birds may also not infrequently be seen fighting over food, on or just above the ground. In head-tossing display at or near nest, jerks head back on to mantle and forward again, or rolls nape across shoulders with more circular action.

**BREEDING** Variable season according to latitude and rains. (October) January-May in southern USA, December-April in Central America, January-May in Colombia but September onwards in Venezuela, July-January in central Argentina, November-March in south; supposedly sometimes double-brooded. Nest is bulky and untidy structure, 60-100 cm or more across and 15-40 cm deep, of local sticks, straw, rushes or crowberry, ends pointing out in all directions, usually lined at most with pellets and odd bits of dung, skin and bone, but in Falklands with wood; often at 8-30 m in dense crown of isolated palm, pine or other tree or one in small wood, more locally in cactus, or on ground under rock overhang or tussock. Clutch 2-3 (1-4). Incubation 28-32 days. Fledging not recorded (?).

**POPULATION** No data on densities, and status varies greatly from rare to common, but species' range covers some 8-9 million km<sup>2</sup> and so total population in high hundreds of thousands would require only 1 bird/10 km<sup>2</sup>, while 1 pair/100 km<sup>2</sup> would still give low six-figure result. In some areas the density is much greater than the range of these figures, but elsewhere far less. Suffers from shooting and poisoning in sheep country and, locally, there has been some loss of habitat, but in general certainly extending range and probably increasing in numbers through deforestation, and consequent spread of cattle-ranching and sheep-rearing, both in Amazonia and to higher elevations in Andes.

**GEOGRAPHICAL VARIATION** Two to four races usually recognised (others have been named). *C. p. cheriway* (together with *auduboni* and *pallidus*) is sometimes regarded as a separate species: Northern Caracara *C. cheriway*.

*C. p. planicus* (southern South America and islands, southwards from south Peru, north and east Bolivia and sub-Amazonian Brazil) Largest race, especially in south, with blackest crown, extensively barred back, breast and crissum.

*C. p. cheriway* (east Panama, Dutch Lesser Antilles and northern South America south to north Peru and northern Brazil) Smaller; crown and other dark areas less black; ground colour of all pale parts

finely mottled and streaked with cream to buff on crown and nape, and all heavily blotched and streaked chocolate and buff below (though tones vary greatly through abrasion and fading); tail finely barred with these two colours and at most only suggestion of broader sub-terminal band. **Bare parts** Adult eyes dark brown to reddish-brown, juvenile paler brown. Adult cere, lores and eye-rings deep yellow to reddish-yellow behind pale blue to greenish-blue bill; juvenile duller, with bluish cere. Adult legs bluish-white to pea-green, juvenile duller with darker feet.

**FLIGHT** Rather small and lightly built raptor with weak bill, fairly long wings parallel-edged and round-tipped, not prominently fingered, and longish rounded tail; wingspan 2.0 times total length. Buoyant and somewhat erratic flight with floppy shallow beats mixed with short glides; apparently seldom soars. **Adult** Above, mainly blackish-brown, contrasting with cream to buff of both head and dusky-barréd rump and tail (latter with broad subterminal band), also large whitish windows at bases of outer primaries; below, dominant colour cream to buff of whole head, underbody and wing-linings (last often deeper in tone, like crissum), in contrast to blackish secondaries and inner primaries, barred and subterminally banded tail, and very obvious primary-windows. **Juvenile** Back and wings similar to adult's above, if more chocolate, but head, underbody and wing-linings all streaked and blotched buff and dusky-chocolate, and tail and secondaries more barred; more creamy windows again obvious both above and below.

**CONFUSION SPECIES** Adult almost unmistakable except that, seen from above while taking off or flying past, shows some similarity in wing and tail patterns to otherwise clearly darker, larger and much more aquiline Crested Caracara [256] and, in areas of overlap from east Bolivia through Paraguay and northeast Argentina to southeast Brazil and north Uruguay, similar-sized Chimango Caracara [258]. Juvenile more likely to be confused with latter, but that is more uniformly coloured, with paler back and wings, little streaking on body and indistinctly barred tail. Caracaras are quite different in shape, flight and behaviour from buteonine hawks, but juvenile Yellow-headed might conceivably also be confused with those that are streaky, with pale windows and barred tail (e.g. juvenile Grey Hawk [185]).

**VOICE** Noisy only when breeding or during quarrels over food. Main calls are scratchy wailing *keeah*, or more drawn-out *keeeeee*, sometimes singly, more often repeated and, when excited, rapidly so, at same time throwing head up or back; deeper, harsher and more growling *kraaa-kraaa-kraaa* or *krrrr-krrrr-krrrr*; piercing *chay*, and thin hissing whistle, *ksyeh, ksyeh*.

**FOOD** General scavenger: carrion, especially roadkills; insects and other arthropods, most notably orthopterans, ticks, dipterous maggots, and caterpillars, but also including crabs; frogs, toads and dead or stranded fish; nest contents, and young or injured birds and mammals; and some vegetable matter, including oil-palm fruits, dried coconut flesh (copra), other fruits, maize, and seeds and other recyclable material from horse dung. Hunts to some extent on wing, not very high, even dropping on to incapacitated or other

possible vertebrate prey, but spends much time walking on ground: runs and flaps after mice, lizards, amphibians, crabs, large insects. Often forages among cattle, perching regularly on their backs to pick off ticks, also pecking at and enlarging open wounds.

**SOCIOSEXUAL BEHAVIOUR** Solitary, in pairs, or in small groups of up to ten or more. Apparently soars very little, and then only very briefly. No other aerial display recorded.

**BREEDING** Variable season according to latitude and rains: December-March/April in Costa Rica, evidently January-April and July-September in Colombia and at least second of these periods in Venezuela, but around February-May onwards in Guyana and Surinam, and September onwards in south Brazil and northeast Argentina. Nest is fairly substantial structure of sticks high in tree (12-15 m recorded), in north of range especially in crown of oil-palm. Clutch 2 (1-2). Incubation and fledging periods not recorded, but likely to be about 4 and 5 weeks respectively.

**POPULATION** Limits of range encompass nearly 12 million km<sup>2</sup>, but this is neither a mountain nor a forest species and actual distribution must cover less than half that area. No data on densities, but this is a common bird in some areas, locally even very common, and total numbers must lie at least in upper six-figure range, perhaps even above one million. Generally not persecuted, or threatened in any way, and seems likely to continue spreading with deforestation.

**GEOGRAPHICAL VARIATION** Sometimes up to four races recognised, restricting nominate *chimachima* to south of Amazon and otherwise including any or all of *strigilatus* (northeast Brazil), *paludivagus* (Surinam and French Guiana) and *condatus* (Colombia eastwards north of Amazon), but regional tendencies in intensity of colour saturation and strength of tail-barring appear to be clinal and, in any case, tone of head and underparts varies greatly individually since older adults appear to become increasingly paler: in our view, this species is best treated as monotypic. Replaces Chimango Caracara [258] of southern South America, with only slight overlap, and, although very different in some ways, these two can be regarded as forming a superspecies.

**MEASUREMENTS** ♂ wing 265-309 mm, ♀ 274-306 mm; ♂♀ tail 181-211 mm, tarsus 52-61 mm. **Weights** ♂ 277-335 g (ten), ♀ 307-364 g (six).

**REFERENCES** Blake (1977), Contreras *et al.* (1990), de la Peña (1992), French (1985, 1992), Fjeldså & Krabbe (1990), Haverschmidt (1962, 1968), Hilty & Brown (1986), King (1989), Mader (1981), Meyer de Schauensee & Phelps (1978), Narosky & Yzurieta (1993), Ridgely & Gwynne (1989), Sick (1993), Snyder (1966), Sibley & Skutch (1989), Tostain *et al.* (1992), Vuilleumier (1970), Young (1925), Voous (1969).

258 CHIMANGO CARACARA  
*Milvago chimango* (Vieillot, 1816)

Plate 87

Other names: Chimango, Chimango Hawk

**DISTRIBUTION** Neotropical (20°S to 55–56°S); order 7; widespread and, rather variably, scarce to very common or abundant. South-central and southern South America: from north Chile (mainly from about Atacama, but locally north to Tarapacá), east and southeast Bolivia (rare), Paraguay (often scarce), and extreme southeast Brazil (Rio Grande do Sul, common) almost throughout Uruguay, Argentina and central and south Chile to Tierra del Fuego and associated islands. Introduced to Easter Island, in South Pacific.



**MOVEMENTS** Sedentary, nomadic and, in south, apparently at least partially migratory. While many populations probably resident, some roosting concentrations and large nesting colonies come and go, presumably in response to food and habitat changes, while southern numbers may be greatly reduced in austral winter, indicating northward movement. Species also wanders to temperate uplands, quickly spreads to newly available habitat, and readily exploits rich food sources. Vagrant to Falkland Islands (Islas Malvinas).

**HABITAT** Almost any open or fairly open country, often with scattered trees or shelterbelts; agricultural areas and grassland of all types; marshes, timbered riversides and other wetlands; beaches and rocky coasts; Patagonian steppe and scrublands; mountain foothills, valleys and even around settlements on arid Andean slopes; open woodland; and extending into built-up suburban areas and even town and city parks. Perhaps commonest of all in such places as the mixed cattle-ranching and wheat belt of the pampas of east-central Argentina, by fishing villages in south-central Chile, and around extensive marshlands and rubbish dumps anywhere. Sea-level to 3,000 m, straggling to 4,000 m, but mainly below 2,000 m.

**FIELD CHARACTERS** Small, slight caracara, all cinnamon-brown to grey-buff with obscure markings at rest, when momentarily mistakable for various other raptors, but readily recognised by its featureless appearance, lack of pattern, and yet curiously distinctive jizz

(not well caught by plate 87, but see fig. 54): weak bill, flattish head, slightly capped or frowning look, almost fully feathered face, long wings, longish tail, and short legs. Often quite approachable; walks, runs and wades, also dust-bathes; perches openly on ground, clods, tussocks, posts, fences, trees, buildings; wing-tips near tail-tip. Sexes similar and, although female averages 4–7% larger and heavier, much overlap in size and weight; juvenile rather similar, too, but distinguishable in good view; as adult after first complete moult.



Fig. 54. Chimango Caracara *Milvago chimango* [258] to give a better idea (cf. plate 87) of the jizz of this most abundant raptor of the cattle-ranching and wheat belt of east-central Argentina: often in tens, sometimes in hundreds, feeding with gulls behind ploughing tractors, on rubbish dumps, round slaughterhouses, or perched in ones or twos by roadsides. All brownish but for pale wing-patches and rump, its weak bill, flattish head and frowning look make it curiously distinctive.

**PERCHED Adult** Mainly brown and grey-brown to cinnamon-brown, with dark streaks on crown and nape, and post-ocular stripe (little more than shadow) giving capped or frowning expression; paler edges to back and wing-coverts, whitish rump above thinly barred grey-buff tail with broad dark subterminal band and thin white tip; all faintly dusky-streaked and obscurely grey-banded below but for plain buff throat and crissum; pale patch may or may not show at bases of primaries on folded wings. **Juvenile** Broadly similar, but more rufous edges above and more rufous tinge below, some whitish streaks or spots, and only obscure subterminal tail-band. **Bare parts** Eyes brown. Cere and lores dull yellow to pinkish behind light horn-coloured bill. Legs greyish-white with bluer feet.

**FLIGHT** Rather small and lightly built raptor with weak bill, longish wings parallel-edged and round-tipped, not prominently fingered, and rounded tail; wingspan 2.2 times total length. Buoyant and often erratic flight; floppy measured beats mixed with short glides on bowed wings; unlike most caracaras, often soars quite high, on flutter wings. **Adult** Appears mainly brown apart from whitish rump, greyish tail with broad subterminal band, and large whitish-buff windows at bases of primaries;

stated to be 'temporary' throughout Brazilian range and one August record as far south as Rio Grande do Sul.

**HABITAT** Forest clearings and edges, remnant patches, open and riverside woodland, palm groves, cerrado and other savannahs with scattered trees, plantations and secondary growth, occasionally even isolated trees, less often in continuous forest, where far more thinly distributed (apparently absent from dense primary rain-forest). Most numerous in humid tropical zone, less so in drier and subtropical regions. Sea-level to 1,500 m, rarely to 2,500 m.

**FIELD CHARACTERS** Mid-sized and stout-bodied primitive falconiform, brown, buff and conspicuously masked in all plumages, with obviously large eyes and head (owl-sized but not especially owl-like), thick 'toothless' bill, short wings, longish rounded tail, and thick rough-scaled legs with stubby toes. Sluggish and confiding, perching more or less openly at medium heights for long periods, sometimes in thin cover but often conspicuously on dead branch or even telegraph pole; sits very upright with bent head watching ground, occasionally nodding head or jerking tail, sometimes sidling along branch; wing-tips cover only base of tail. Sexes similar, and almost no difference in size, though female averages slightly longer-tailed and, on few data, 20% heavier; juvenile also similar, though usually distinguishable on good view.

**PERCHED Adult** Head and whole underbody varying individually, geographically and seasonally (with fading and wear) from rich buff or cinnamon-buff through pale buff to cream, except for broad blackish to brown mask extending from lores through eyes and upper cheeks before narrowing across nape; fine black shaft-streaks on crown, sometimes dark spots on thighs; back and wings uniformly dark to blackish-brown, but uppertail-coverts pale buff to cream; blacker tail with four to five buff bands and tip. **Juvenile** Broadly similar, but rufous or buff edges to dark brown feathers of back and wings obvious until plumage abraded; pale tail-bands narrower and more cinnamon; usually more dark spotting on thighs. (Juveniles variously described by different authorities as whiter or darker buff than adults: cf. B&A and Stiles & Skutch, while Haverschmidt also suggested variation among adults due to colour intensity decreasing with age.) **Bare parts** Eyes dark brown. Cere and legs dull yellow (juvenile supposedly paler).

**FLIGHT** Mid-sized falconiform with big head, short rounded wings and longish rounded tail; wingspan only 1.7 times total length. Flight infrequent and relatively slow and steady, with hurried stiff shallow beats and short glides on flat wings; on alighting, flicks tail up and down; does not apparently soar. **Adult/Juvenile** Mask extending across nape usually obvious; otherwise mainly dark above with contrasting pale crown, hindneck, rump and tail-bands, also conspicuous cinnamon bases to primaries; below, mainly pale, with buff to cream body, usually more rufous-buff wing-linings (often sparsely brown-spotted), and dusky-banded primaries showing cinnamon-buff windows when backlit, but tail looks darker apart from three to four buff bands and tip.

**CONFUSION SPECIES** Unlikely to be mistaken. In Panama and South America, range overlaps with that of Yellow-headed Caracara [257], which has comparable

pattern and colours, but lacks broad mask (only narrow line behind eyes) and also differs in smaller head, relatively longer wings, far more thinly barred tail with broad subterminal band, and much less erect posture.

**VOICE** Exceptionally vocal for raptor. Short nasal laughing calls when disturbed, also louder *wac wac* or *law law*. Full advertisement call is long rhythmic far-carrying series of loud hollow notes with something of quality of child's shout: often after bubbly laugh at outset, series of *wah* notes that gradually increase in pitch and loudness, finally breaking into series of *wah'-co* phrases; entire sequence lasts minute or more. (Paraphrased from Stiles & Skutch, which seems most satisfying of many descriptions.) Also soft *ha* or *hah*, repeated irregularly. Sometimes pair duets, especially at dawn and dusk, often in evening twilight, and even in middle of night, 'their notes alternately syncopated, simultaneous, or out of sequence, but not antiphonal' (Hilty & Brown): duetting may last up to 9 minutes. (Cf. Collared Forest-falcon [265].)

**FOOD** Almost entirely snakes, small or large, harmless or poisonous, terrestrial or arboreal; common prey in Brazil ranges from innocuous vine snakes *Philodryas/Liophis* to the venomous corals *Micrurus*; one study in Guatemala, involving some 20 species of snake, found at least 59% of those preyed on were terrestrial compared with at least 30% arboreal; small species swallowed tail first, large ones picked to pieces. Occasional lizards and rodents, also fish and single records of bird and centipede; more surprisingly, said in Brazil locally to prefer catching bats, standing watch in front of cliffs where they roost (Sick). Largely, if not exclusively, still-hunts from open perch; sits erect for long periods, peering at ground, occasionally turning head through 180°, then suddenly drops or pounces on to snake with audible thud, gripping ■ behind head, which it then often bites off. Small snakes are carried to feeding perch in bill, large ones in feet, trailing behind like so much hunting.

**SOCIOSEXUAL BEHAVIOUR** Usually noted singly, apart from duetting of presumed pairs. No aerial displays described and apparently all advertisement vocal.

**BREEDING** Season varies considerably with latitude, less consistently with rains (lays in dry season in Central America, in rains in Venezuela): April onwards in Mexico, February–June from Guatemala to Costa Rica, from perhaps May in southwest Colombia, September onwards in Venezuela, and from January (or earlier?) in north Argentina. Breeds usually in large hollow cavity at 3–30 m in emergent or isolated tree, sometimes in old stick nest of another raptor or on top of epiphytic ferns in tree fork, or in hole in cliff, making scrape but adding little, if any, material. Clutch 1 (1–2). Incubation not recorded. Fledging c57 days.

**POPULATION** Wide distribution encompasses over 10 million km<sup>2</sup>. Home ranges in typical broken habitats have been estimated at 400–900 ha, in more continuous forest at much larger 2,500 ha. If, on this basis, an average of, say, 1 pair/15 km<sup>2</sup> in suitable areas were postulated, a total seven-figure population might be expected, but species is mostly uncommon to, at best, fairly common or very locally common. Regarded as

**263 PLUMBEOUS FOREST-FALCON**  
*Micrastur plumbeus* WL Sclater, 1918

Plate 89

Other name: Sclater's Forest-falcon

**DISTRIBUTION** Neotropical (5°N, or more probably now only 4°N, to 0°); order 4?; until mid 1980s known only from a dozen specimens collected over previous three-quarters of a century, and thought to be rare, even if probably overlooked, but since then birds mist-netted and pairs studied in total of nine sites; still uncommon and local, with restricted range, rarely seen – though under-recorded – and regarded as vulnerable. Northwestern South America endemic to, at most, some 600 km of Pacific slope of southwest Colombia (south Chocó, Valle, Cauca, Nariño) and northwest Ecuador (Esmeraldas, Pichincha), but range very fragmented.



**MOVEMENTS** Considered sedentary within home range of approximately 35 ha.

**HABITAT** Understorey of wet foothill and lower premontane primary forest (originally thought to inhabit mainly lowland tropical zone); apparently absent from suitable humid forest in same region. Also closed-canopy forest with selective logging, though less numerous there. Absent from secondary forest. Old records range from about 20–1,000 m, but mostly 300 m or over, while recent records largely between 500 m and 1,450 m.

**FIELD CHARACTERS** Small forest-falcon, as adult slate-grey, paler grey and finely black-banded whitish, broadly similar to sympatric Banded Forest-falcon [261], with short 'toothless' bill, slight facial ruff, rounded wings, graduated tail and fairly long legs, but bulkier, with relatively longer wings and shorter tail. Character and general behaviour different from Banded (see Food); perches within dense cover close to ground and on forest floor when foraging; wing-tips exceed uppertail-coverts. Sexes similar and little difference in size, but female somewhat larger and heavier; juveniles distinct, but variable.

**PERCHED** Adult Slate-grey above, tending to be slightly paler on head and mantle, with only one quite conspicuous white bar and white tip on blacker tail; below, pale grey on throat and upper chest, merging into whitish with fine blackish barring that becomes indistinct or absent on lower flanks, belly and crissum. **Juvenile** Apparently much as adult above, including

single white bar on tail; white to pale buff below with coarser and sparser dusky-brown barring on breast and flanks. **Bare parts** Adult eyes pale brown (despite various descriptions as brown, red-brown, yellowish-grey and whitish-beige), juvenile dark chocolate-brown. Cere, lores and broad orbital rings flame-red. Legs reddish-orange.

**FLIGHT** Small, relatively bulky falconiform with rather broad rounded wings proportionately not quite so short as some congeners, and tail clearly shorter (though still well rounded); wingspan 1.65 times total length. Flight action comparable to that of Banded and Lined Forest-falcons [261, 262], including two to three flaps followed by brief glide over short distances; no flights over canopy.

**Adult** All dark above; tail blacker with white tip and one central white bar; below, grey throat and upper chest shading into fine-banded whitish breast, but, distinctively, belly, crissum and wing-linings almost plain white; flight-feathers coarsely banded with blackish below, and primaries dark-tipped. **Juvenile** Upperparts and tail much as adult; all white to pale buff below, with coarser dusky barring on breast and flanks; wing-linings plain and flight-feathers as adult; dark brown eye readily distinguishable in good view.

**CONFUSION SPECIES** Bare-part colours and single broad tail-band separate this forest-falcon from others within range. Most likely to be overlooked as Banded Forest-falcon [261], which has relatively shorter wings and longer tail (thus more accipiter-like) – with usually three (two to four) obscure whitish bars as adult and three to four as juvenile – while grey-morph adult has far yellower cere and lores, much more extensively banded lower abdomen and wing-linings, and different call; and juvenile Banded is browner above, with variably complete nuchal collar, white spotting on uppertail-coverts, and ground colour below usually less white. Two other, bigger congeners, however, also sympatric: large Collared Forest-falcon [265], unlikely to be confused in any plumage or morph; and mid-sized Slaty-backed [264], much more similar in wing/tail proportions and colours, but confined to lowlands (below 500 m) and with three tail-bars, completely plain whitish to cream throat and underbody (juvenile breast only dusky-mottled), entire underwings whiter-looking but for broader dark trailing edges.

**VOICE** Territorial advertisement, mainly during first 20 minutes from dawn (rarely at dusk), begins with single quiet, lamenting 'quacking' or 'barking' Q'A, repeated for several minutes with gradual increase in strength and speed to evolve into about six notes per c2 seconds, these bouts of six or so notes repeated at intervals of c5–10 seconds, at varying speed and intensity, for up to 15 minutes; other member of pair will sometimes continue the territorial song; sings from perch in canopy and mid-storey but, as with others of genus, extremely hard to locate owing to ventriloquial quality of voice. Cackling alarm call; this elicited also by playback of tape recording, when became greatly agitated, usually immediately stopped singing and descended to dense

buff below with coarse dusky barring more widely spaced and apparently confined to lower breast and flanks. (The one specimen described was considered by B&A to be subadult, not first plumage, but most forest-falcons and, indeed, falcons moult directly into adult plumage.)

**Bare parts** Eyes dark brown. Cere, lores and broad orbital rings dull greenish. Legs more or less yellow.

**FLIGHT** Largish, slim and somewhat accipiter-like falconiform with short rounded wings and long graduated tail; wingspan only 1.5 times total length. No descriptions of flight action. **Adult** Above, all blackish but for broad white collar, white spots on uppertail-coverts, and thin white tip and three bars on tail (females may also show white spots on secondaries); below, mainly white, including wing-linings, in contrast to strongly barred dark grey and white flight-feathers, and blackish tail with four white bars on outer feathers (barred effect underneath also exaggerated by strongly graduated tips); head pattern with black crescent curving forward on rear cheeks. **Juvenile** Insufficiently known: similar flight-feathers and tail; apparently also blackish above, including comparable if less distinct head pattern, but collar and underparts whitish to buff, with widely spaced dusky barring confined to lower breast, flanks and, possibly, greater wing-coverts.

**CONFUSION SPECIES** Most likely to be overlooked as pale morph of Collared Forest-falcon [265], whose vast range includes almost all that recorded for this relatively local endemic, but Collared generally larger, with slightly longer wings and tail (some overlap) and, in particular, significantly longer legs and larger feet; adult has five to six bars (instead of four) on underside of tail, and browner juvenile more or less completely barred below. Less likely to be mistaken for other forest-falcons [261–264]; see Collared for juvenile Bicoloured Hawk [148] and other possible confusion species.

**VOICE** Not described, but presumably differs from that of Collared Forest-falcon [265].

**FOOD** Unknown, except one museum label's reference to small tree-rat *Mesomys* in stomach. Short legs may be adaptation for foraging in trees rather than running on ground, while small feet and apparent low RSD suggest that – unlike Collared Forest-falcon [265] – birds do not form significant proportion of its prey.

**SOCIOSEXUAL BEHAVIOUR** Probably, like other forest-falcons, singly or in pairs. No data on vocal or visual displays.

**BREEDING** Recently fledged juvenile at c 12°S in Peru on 21–22 July indicates eggs laid there in April. Nest undescribed and no other data.

**POPULATION** Although known from less than a dozen specimens, plus few observations, and long regarded as rare, this bird has extremes of recorded distribution over 1,800 km apart from north to south and could well extend farther east than recognised in forested upper reaches of Amazonia, while numbers of the notoriously inconspicuous forest-falcons are, in general, now realised to have long been seriously underestimated. As yet, any guess at order of population size quite impossible. At least part of known range now being deforested, but this virtually unknown raptor 'seems likely to prove to be relatively widespread and secure' (Collar & Andrew). Even so, and as with this whole genus, ever-widening forest clearance must be long-term threat.

**GEOGRAPHICAL VARIATION** Monotypic. Long regarded as race or variant of Collared Forest-falcon [265], with which easily confused, but shown by Traylor to be distinct species.

**MEASUREMENTS** ♂ wing 209–219 mm, ♀ 217 mm (one); ♂ tail 215–235 mm, ♀ 230 mm (one); ♂♀ tarsus 55–65 mm. **Weights** No data.

**REFERENCES** Amadon (1964), Blake (1977), Collar & Andrew (1988), Collar *et al.* (1992), Hilty & Brown (1986), Meyburg (1986), Meyer de Schauensee (1982), O'Neill & Pearson (1974), Traylor (1948, 1958).

---

---

## Family Falconidae (a: pygmy-falcons, Old World falconets)

### 267 AFRICAN PYGMY-FALCON

*Polihierax semitorquatus* (A Smith, 1836)

Plate 91

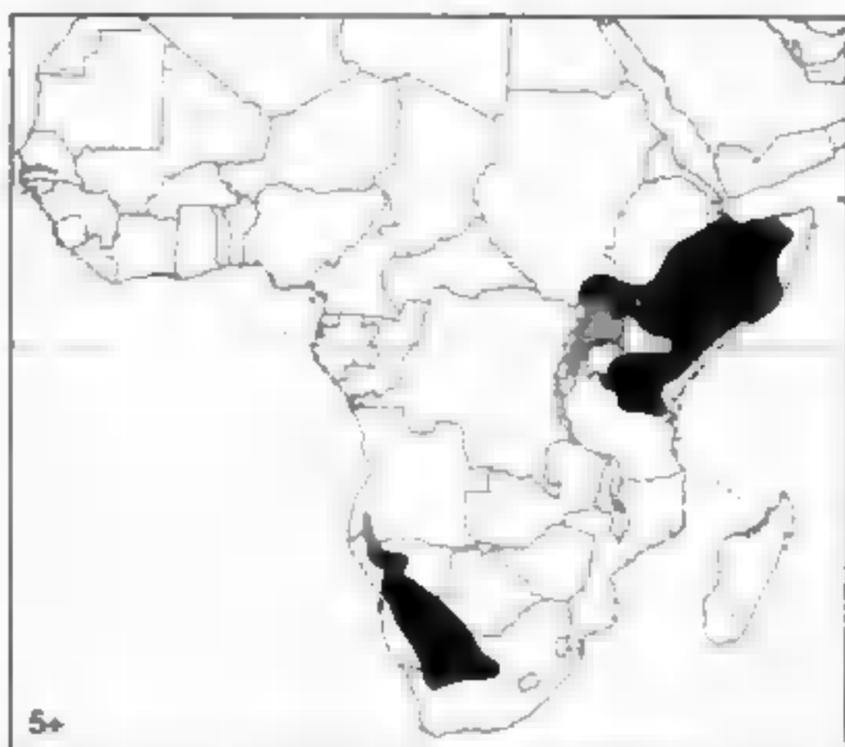
Other name: Pygmy Falcon

**DISTRIBUTION** Afrotropical (11°N to 29°S); order 5+; fairly common to common. East and southern Africa in two discrete areas: (a) southern Sudan, east and south Ethiopia and west Somalia through Kenya west into north Uganda and extreme northeast DR Congo, and south into northern Tanzania, as far as Mwanza, Wembere and Dodoma; and (b) Namibia, possibly north into southernmost Angola, and southwest Botswana into north-central South Africa. Suggestion of third discrete population in south-central Mozambique (north Gaza

into Manica and west Sofala) is based on suspect records that 'remain to have recent confirmation' (AC Kemp).

**MOVEMENTS** Generally sedentary, but for minor local movements in southern Africa in winter; wanderers recorded up to 650 km south of known range in Tanzania may indicate dispersal by immatures. Probably vagrant to northeastern South Africa and south Mozambique.

**HABITAT** Dry acacia savannah, thornbush, and sub-desert scrub, largely coinciding with distributions of two main host species of weavers, in whose nests pairs breed and roost (see Breeding). Sea-level to 1,600 m.



**FIELD CHARACTERS** Tiny, stocky, shrike-like falcon, blue-grey, white and black as adult, female with chestnut mantle, with small hooked beak, relatively large feet. Spends long periods on regular perches on top of or on conspicuous side branches of thorn trees, overlooking more or less bare ground, turning head from side to side or almost completely backwards, and characteristically bobbing it up and down before taking off; shortish wings less than half down rounded tail. Sexes similar (apart from back colour), female averaging only 1% larger; juveniles also rather similar, sex for sex, but distinguishable; as adult by end first year, when may breed.

**PERCHED Adult male** Blue-grey above, apart from white forehead, cheeks, uppertail-coverts and thin hind-collar, and all white below; flight-feathers and tail black, with white spots and tips more obvious on tail. **Adult female** Differs only in chestnut mantle and back. **Juvenile** Male and female also rather similar to corresponding adults, but grey of upperparts edged rufous, white underparts washed buff and thinly dark-streaked. **Bare parts** Eyes dark brown. Adult cere and orbital rings red-orange to red, juvenile paler orange to pink. Adult feet pinkish-red to red, juvenile usually paler.

**FLIGHT** Tiny and compact raptor with shortish wings quite pointed, medium-length tail; wingspan 1.7 times total length. Flight fast, low and markedly undulating, with rapid beats interspersed with woodpecker-like dips on closed wings; does not soar. **Adults** Grey and white (with or without obvious chestnut patch on back); blackish flight-feathers and tail much more clearly spotted and barred than when perched, and white rump conspicuous. **Juvenile** Not really distinguishable from adults in flight, unless streaking can be seen on underbody.

**CONFUSION SPECIES** Almost unmistakable. Size, general colouring and stance mean that, on very casual view, grey-backed male just might be overlooked as a shrike, of which most likely candidates are Northern and Southern White-crowned *Furnacephalus* (if white crown cannot be seen from below) and migrant Lesser Grey *Lanius minor* from Palearctic during October-early May, but all look slimmer, longer-tailed and differently patterned.

**VOICE** Often described as silent outside breeding season, but in fact quite noisy at all times in social

encounters, especially at dusk and dawn around roosts where families gather and interact. Calls are not loud, however, and used only in contact, greeting, soliciting, copulation, or alarm at or near nest site. These include thin squeaky *tsee-tsee*, high *toor-toor-toip*, emphasised on final syllable; variably accented *ki-kikik* or *kiki-kik*; and soft putting *krrr-krrr-krrr...* Southern race also said to mimic calls of Sociable Weaver hosts (see Breeding).

**FOOD** Mainly large insects (beetles, grasshoppers) and small lizards (sand-lizards, agamids, skinks); some other arthropods, small rodents and few small birds (occasionally including host weavers and their nestlings). Insects easily most numerous prey items, but lizards more important by weight, especially when young being fed. Still-hunts from perch, head-bobbing when prey sighted, then usually swooping down to catch on ground and carry back up in foot or bill. Late termites may be eaten on ground or caught in flight. Passing birds occasionally attacked with short accipiter-like chase, but rarely caught on wing.

**SOCIOSEXUAL BEHAVIOUR** Pairs or family parties; pair-members stay together throughout year. Usually territorial, but 2-3 pairs in one communal weaver nest recorded in Namibia. Sometimes polyandrous. No aerial displays known, but tail-wagging, showing pattern of white on black, often follows courtship-feeding and precedes copulation: male may or may not move tail up and down, but female does so more persistently while crouching to emphasise chestnut back and show white uppertail-coverts (which may even be raised). Male then head-bobs and sometimes flies into nest-chamber followed by female, both calling. Head-bobbing otherwise used at various times of excitement or alarm.



**Fig. 55.** African Pygmy-falcon *Polihierax semitorquatus* [267] perched by huge conglomerate nest of Sociable Weavers *Philetairus socius*. This tiny falcon breeds, probably exclusively, in the multiple nest-chambers of colonial weavers, particularly *Philetairus* in southern Africa, and in the composite stick-nests of White-headed Buffalo-weavers *Dinemellia dinemelli* in East Africa.

**BREEDING** August–March in southern Africa (mostly October–January), and two broods may be raised; July–January in northeast Kenya, and June onwards in Somalia. No nest built or even lined, but lays in thorn-tree nest-chambers of colonial weavers (probably invariably, though reputedly nests of ‘starlings’ have been used); these chiefly the large stick nests of White-headed Buffalo-weaver *Dinemellia dinemelli* in northeast and, more remarkably, the communal conglomerations of Sociable Weaver *Philetairus socius* in south, using up to six of the latter’s chambers for its own. Roosting, but not nesting, has also been confirmed in the similarly compound nests of White-browed Sparrow-weaver *Plocepasser mahali*, but suggestion that Red-billed Buffalo-weavers *Bubalornis niger* might also be hosts appears linked only with the questionable breeding in Mozambique (see Distribution). Clutch 2–4. Incubation 27–31 days (probably 28–29). Fledging c.30 days, but may leave and return at 27–40 days, and remain up to 60 days in natal territory.

**POPULATION** In the Kalahari Gemsbok National Park, South Africa, in area where only one quarter of available weaver colonies were occupied by Pygmy Falcons, ten pairs were spread about 800 m apart, suggesting that each needed territory of under two-thirds of 1 km<sup>2</sup>. This species is distributed over some 2.5 million km<sup>2</sup> in Africa,

but that figure includes much unsuitable habitat and the bird is only locally as common as it appears to be in the Kalahari. Thus, total population in upper tens, or lower hundreds, of thousands seems possible. Unless thorn-bush (and weaver colonies) locally destroyed by slash-and-burn or war, unlikely to be threatened in any way.

**GEOGRAPHICAL VARIATION** Two races often distinguished, but poorly differentiated.

*P. s. semitorquatus* (southern Africa)

*P. s. castanotus* (northeast Africa) Averages fractionally larger at higher end of scale, and supposedly darker with brighter cere and legs; wing-linings not pure white, odd feathers showing brown bar (not seen in field).

**MEASUREMENTS** *P. s. semitorquatus* ♂♀ wing 110–119 mm, tail 69–74 mm, tarsus 24–28 mm. *P. s. castanotus* ♂♀ wing 112–131 mm. **Weights** *P. s. semitorquatus* ♂ 59–64 g (two), ♀ 54–67 g (12). *P. s. castanotus* 44–72 g.

**REFERENCES** Ash & Miskell (1983), de Swardt (1990b), Biggs *et al.* (1979), Britton (1980), Brown (1989b), Brown *et al.* (1982), Daneel (1966b), Ginn *et al.* (1989, 1993), Griffiths (1994), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957, 1962), Maclean (1970), Marx & Adam (1986), Pickford *et al.* (1989), Sapsford (1986), Snow (1978), Steyn (1982), Thomsett (1991b), Zimmerman *et al.* (1986)

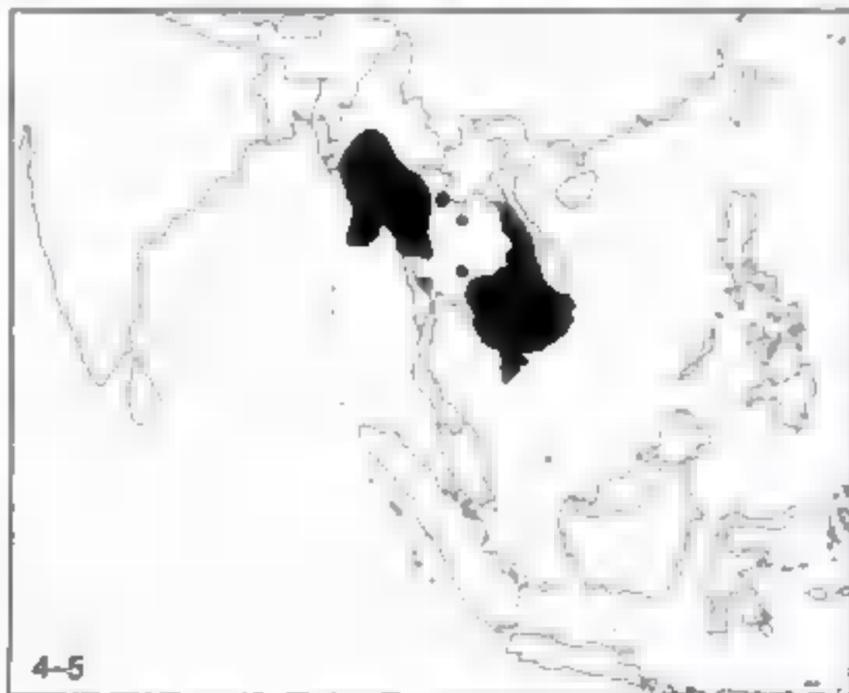
## 268 WHITE-RUMPED PYGMY-FALCON *Polihierax insignis* Walden, 1872

Plate 91

Other names: White-rumped Falcon, Burmese Pigmy Falcon, Fielden’s Falconet

**DISTRIBUTION** Indomalayan (24°N to 9°N); order 4–5; formerly widespread and fairly common to locally abundant, but now generally scarce and local. Mainland southeast Asia: Burma (central and south, especially Irrawaddy valley and into north Tenasserim), Thailand (northwest and west, down to same latitude as Bangkok, and exceedingly locally in northeast), Laos (central and south), Cambodia (chiefly in north), and Vietnam (south Annam, Cochinchina).

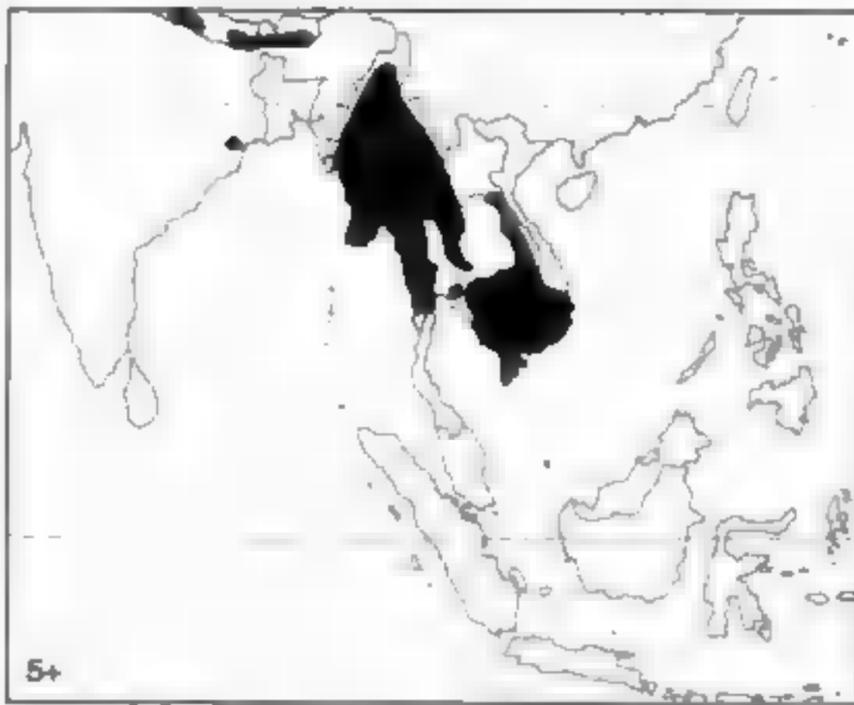
**MOVEMENTS** Believed to be sedentary.



**HABITAT** Dry dipterocarp and mixed deciduous woodland, especially in more open areas or by tracks, clearings, edges and other interfaces; also wooded savannah. Sea-level to 900 m, chiefly below 700 m.

**FIELD CHARACTERS** Small, stocky, shrike-like falcon, streaky grey or plain rufous on head and mainly white on rump and underparts, with relatively large head and feet, shortish wings, longish and strongly rounded tail (too short on plate 91); larger than African Pygmyfalcon [267] and considerably bigger and much longer-tailed than southeast Asiatic falconets [269–273]. Often perches conspicuously, sometimes head bobbing, on top or edge of tree or bush; also able to cling to trunk like woodpecker, and even to run up it without opening wings; wing-tips less than half down tail. Sexes differ clearly in plumage, and female also averages slightly bigger, mainly because of longer tail; juvenile distinct, and immature female separable as soon as first new head-feathers appear.

**PERCHED** All plumages Bold white rump and uppertail-coverts. **Adult male** Head and upper mantle whitish with dusky streaks, so looking streaky grey; otherwise, apart from white rump, all more or less slate-grey above (brownier on greater coverts and remiges, latter with concealed white spots, and blacker on tail with somewhat hidden white bars and tips on outer feathers); all white to cream below, tinged pale grey on flanks, except in upper Burma, where some dusky streaking on chest-sides and flanks. **Adult female** Similar, except for almost plain chestnut crown, nape and mantle; forehead and



Sikkim, Bengal, mainly northern Assam) and of Nepal and Bhutan, and from Burma (central and east, south to Tenasserim), Thailand (northwest and west, but not peninsular, also in strip east of central plains), Laos (central and south), Cambodia (especially north), and Vietnam (south Annam, Cochinchina).

**MOVEMENTS** Largely sedentary, but said to move down from higher parts of Himalayan range in winter. Some wandering indicated by records in Gangean lowlands and at 2,000 m in Himalayas; vagrant to south China (Yunnan).

**HABITAT** Open deciduous forest, clearings and edges in evergreen forest, abandoned hill cultivation with some trees; often near water. Mostly 200–800 m, fairly regularly to 1,700 m; recorded sea-level to 2,000 m.

**FIELD CHARACTERS** Minute falcon, very shrike-like in shape, mainly pied and having bold white supercilia and collar, with relatively heavy double-toothed bill, shortish wings, medium-length tail, strong half-feathered legs, and powerful feet. Perches conspicuously on top or edge of tree or bush, often on dead twig, frequently bobbing head and slowly moving tail up and down; wing-tips less than half down tail. Sexes similar, but female averages c8% larger (up to 20%); juvenile also quite similar, but distinguishable in good view (some females may retain head plumage into second year?).

**PERCHED All plumages** Bold white (or rufous-tinged) forecrown, supercilia and collar. **Adult** Slightly glossy black above, with distinctive head pattern of white forehead and forecrown, supercilia, lower cheeks, and collar, together surrounding broad black eye-stripes extending down to sides of neck; if tail spread, white spots may show on inner webs of outer feathers; below, white collar extends down over breast (slightly buff-tinged in Himalayan region), but throat, flanks, thighs and crissum rufous. (Some adult females may retain some juvenile rufous on head?) **Juvenile** Broadly similar, but forehead and supercilia and, variably, cheeks and collar more or less tinged tawny-rufous, while underparts usually less rufous and throat whitish; in fresh plumage, thin rufous edges to back and coverts. **Bare parts** Eyes dark brown. Cere greenish-black. Legs dark slate to black.

**FLIGHT** Tiny, compact falcon with shortish pointed wings, squarish-ended tail often spread; wingspan 2.0

times total length. Flies fast with several rapid beats, then long glide; sometimes twists and turns with great agility after prey, often gliding back to original perch; soaring not recorded. **Adult** Mainly black above, with contrasting white forecrown, supercilia and collar (first two sometimes still tinged rufous on females?), white spots showing on spread outer tail-feathers and inner secondaries; below, distinct head pattern, rufous throat, flanks, thighs and crissum, more or less whitish breast and wing-linings, white-banded blackish flight-feathers, and four white bars on black tail. **Juvenile** Difficult to distinguish in flight, unless rufous tinge to forehead and supercilia, or lack of rufous on throat, can be ascertained.

**CONFUSION SPECIES** Minute size (in length, little more than House Sparrow *Passer domesticus*) and thickset compact shape with shortish wings and tail make falconets unmistakable. The other two mainland species are virtually allopatric, but might be borne in mind at the relevant fringes of range: neither normally has white hind-collar. Black-thighed [270] (adjacent in south Tenasserim, peninsular Thailand) has thinner white line only behind eyes, and black on flanks and outer thighs. Pied [273] (overlaps Assam; adjacent Bangladesh, north Laos, north Vietnam) is glossy black above and all white below (no rufous). See also White-rumped Pygmy-falcon [268].

**VOICE** High *kli-kli-kli...* or *killi-killi-killi* (B&A).

**FOOD** Mainly large insects, especially butterflies and moths, dragonflies, orthopterans and beetles; occasional small birds to size of warblers (Sylviidae) and pipits *Anthus*, rarely small reptiles and mammals. Watches from open perch with good view, usually at mid-canopy level or higher but sometimes only 1–2 m above ground, and dashes out to chase and snatch passing insects in air, or pluck them from flowers or foliage, occasionally from ground; returns flycatcher-like to same or different perch; also sails around to hawk and eat small insects on wing. Catches moths at dusk, sometimes near artificial light. Two or several may hunt from same or adjacent twigs.

**SOCIOSEXUAL BEHAVIOUR** Gregarious; usually in pairs, often in loose or more huddled (family?) parties of 4–5 or more. No aerial displays recorded. Allopreens in courtship.

**BREEDING** About February–May. Said to nest 'in small colonies' (Stevens). Usually breeds (and at other seasons roosts) in old nest hole of barbet (Capitonidae) or woodpecker, at 6–30+ m in often dead tree, occasionally in natural tree hole or hole in building; no material added other than insect remains. Clutch 4–5 (2–5). Incubation and fledging periods unknown.

**POPULATION** Range extends over rather less than 1.2 million km<sup>2</sup>. No data on densities but, while assessments vary from common to uncommon, so small a species is relatively easily overlooked. Population seems unlikely to be under five figures and could well be in the higher tens of thousands. Commercial logging and clearance for cultivation have had enormous effects on much of southeast Asia, but this bird is aided by its insignificance and does appear fairly tolerant of disturbed habitat; indeed, it may even gain from partial felling, at least temporarily, though continuing deforestation must have long-term adverse effect on all forest raptors.

**GEOGRAPHICAL VARIATION** Two races usually recognised.

*M. c. caerulescens* (Himalayan foothills) Averages marginally larger; narrower collar, rusty-white breast.

*M. c. burmanicus* (Burma to south Vietnam) Averages marginally smaller; wider collar, whiter breast.

Forms a superspecies with Black-thighed Falconet [270].

**MEASUREMENTS** *M. c. caerulescens* ♂ wing 98–106 mm, ♀ 100–112 mm; ♂ tail 58–64 mm, ♀ 64–67 mm; ♂♀ tarsus 20–25 mm. *M. c. burmanicus* ♂ wing 91–99 mm, ♀ 104–109 mm. **Weights** 50–50 g (HBW).

**REFERENCES** Ali & Ripley (1978), Cheng Tso-huin (1987), Deignan (1945), Grimmett *et al.* (1998), Inskipp & Inskipp (1991), King *et al.* (1975), Lekagul & Round (1991), Riley (1938), Ripley (1982), Smythies (1986), Sparks (1965), Stevens (1923–25).

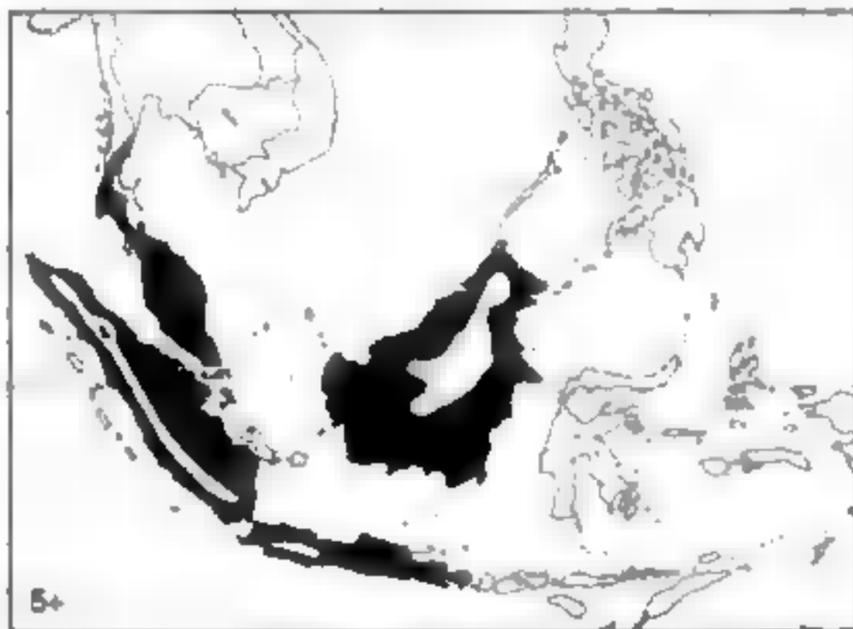
## 270 BLACK-THIGHED FALCONET

*Microhierax fringillarius* (Drapiez, 1824)

Plate 92

Other names: Black-sided, Black-legged (applies to whole genus), Black-tailed (more appropriate to 272) or Malay Falconet

**DISTRIBUTION** Indomalayan (12°N to 9°S); order 5+; fairly common to locally common. Peninsular southeast Asia and large west Indonesian islands: southernmost Burma (south Tenasserim) and peninsular parts of Thailand (fairly common) and Malaysia into Sumatra (common in wooded lowlands), Java (scarce), Bali (scarce), and all except north Borneo (common Kalimantan and Sarawak).



**MOVEMENTS** Apparently sedentary.

**HABITAT** Open woodland, clearings and edges in primary forest, secondary growth, also hunting around adjacent cultivation, villages and even active slash-and-burn forest clearance; often by rivers, streams, paddy-fields. Sea-level to 1,500 m, mostly below 1,200 m.

**FIELD CHARACTERS** Minute strike-like falcon, like related Collared Falconet [269] in shape, if relatively shorter-tailed, and also mainly pied, but with no collar and less white on head (so head much darker). Conspicuous perching behaviour comparable, including hunched posture and bobbing actions; not shy; at one site in peninsular Malaysia, feeding party 'perched 5–30 m high on television aerials, utility poles, electricity lines and isolated trees' within village clearing on either side of river in primary rainforest (Kemp & Crowe). Sexes generally similar, though female averages c3% larger (up to 18%) and 10% longer-tailed; juvenile also quite similar, separable in good view (some females may retain head plumage into second year?).

**PERCHED All plumages** Thin white or rufous-tinged forecrown separated from line behind eyes; no collar. **Adult** Slightly glossy black above, apart from small white patch on forehead and thin white line from eyes around otherwise black ear-coverts and cheeks; if tail spread, white spots may show on inner webs of outer feathers; below, white or rufous-tinged throat and white breast shade into more or less rufous belly, crissum and inside thigh, while flanks and outside thighs black (though this black difficult to ascertain in field when bird perched normally). (Some adult females may retain some juvenile rufous on head?) **Juvenile** Broadly similar to adult, but forehead and line behind eyes – and, more variably, lower cheeks – more or less suffused tawny-rufous, while lower underparts usually less rufous and throat whitish; in fresh plumage, thin rufous edges to back and wing-coverts. **Bare parts** Eyes dark brown. Cere and legs dark slate to black.

**FLIGHT** Tiny, compact falcon with shortish pointed wings, and squarish-ended tail frequently spread; wingspan 2.0 times total length. Action as Collared Falconet [269]. **Adult** Mainly black above, apart from small white forehead and thin white line behind eyes (both sometimes rufous on females?), and white spots sometimes visible on outer tail-feathers and inner secondaries; below, white throat and breast, rufous belly and crissum, now more obvious black flanks and outside thighs, black-flecked white wing-linings, white-barréd blackish flight-feathers, and four white bars on black tail. **Juvenile** Difficult to distinguish in flight, but light parts of head suffused rufous, abdomen paler.

**CONFUSION SPECIES** Because of near-sparrow size, needs to be distinguished only from two other falconets where ranges meet. Collared [269] (allopatric in south-central Tenasserim, southwest Thailand) has clearly more extensive white, or tinged rufous, on head, including hind-collar and forecrown joining broad white supercilia, and all-rufous thighs. White-fronted [271] (parapatric, even sympatric, in north Borneo) has forehead and whole front half of crown back to above eyes either white or rufous-chestnut or buff, paler rufous-buff lower abdomen, plain black tail.

**VOICE** 'A hard, high-pitched cry *shiw* and a fast repeated *kli-kli-kli-kli*' (MacKinnon & Phillipps).

**FOOD** Mainly insects, including moths (wingspan up to 20 cm) and butterflies, dragonflies, alate termites and cicadas, perhaps less often orthopterans and beetles;

occasional small birds (mannikin *Lancharum* and sunbird *Nectarinia* recorded) and lizards. Feeding behaviour much as Collared Falconet [269], but perhaps even more social. In peninsular Malaysia, where feeding party of ten studied, around half of prey caught level with, or slightly lower than, take-off perches (remainder between 60° above and 60° or more below horizontal) and three-quarters at flight distances of 15–20 m (most of rest no more than 60 m, but some at up to 150 m), with 46% success rate (though sometimes two or even three set off after same prey and only one would be successful). When unsuccessful returned to same perch nearly as often as moved to new one, but after successful strike almost invariably took prey to new perch to eat it.

**SOCIOSEXUAL BEHAVIOUR** Gregarious; often pairs or loose groups of up to ten or more (not necessarily families). Sometimes social when breeding. No aerial displays, but protracted allopreening in courtship.

**BREEDING** Mostly February–June to north of equator, though fledglings found in August in Malaysia, but to south laying recorded November–December in Java and evidence of season extended to September in south Sumatra. Usually in old nest hole of barbet (Capitonidae), sometimes woodpecker, at 6–20 m in tree, occasionally in hole under eaves of building; no material added other than insect remains. Clutch 4–5 (2–5). Incubation and

fledging periods unknown. Nest hole may be used for roosting year-round.

**POPULATION** No data on densities and, like the other diminutive falconets, probably under-recorded. Range extends over slightly more than 1.5 million km<sup>2</sup>. Assessments vary from common (Sumatra, Borneo) through fairly common (peninsular Thailand) to scarce (Java, Bali), in which case, over such an area, population seems likely to be at least in the upper tens of thousands. Like its allospecies, Collared Falconet [269], apparently fairly tolerant of habitat disturbance.

**GEOGRAPHICAL VARIATION** Monotypic. Sometimes treated as collarless race of allopatric Collared Falconet [269], but no evidence of intergradation despite closeness of ranges in south Thailand: the two form a super-species.

**MEASUREMENTS** ♂ wing 87–103 mm, ♀ 93–105 mm; ♂ tail 49–55 mm, ♀ 52–62 mm; ♂♀ tarsus 18–22 mm. **Weights** 28–55 g (HBW).

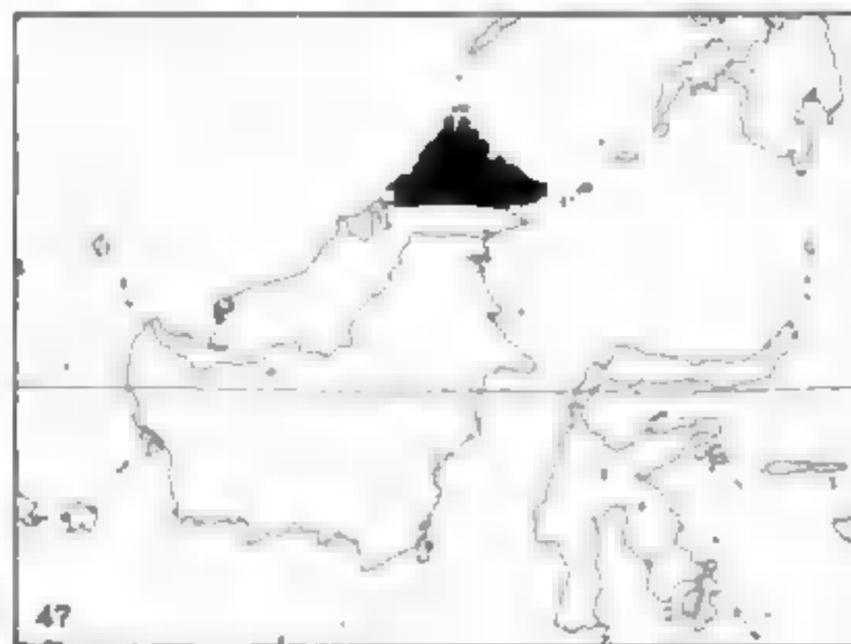
**REFERENCES** Holmes & Burton (1987), Kemp & Crowe (1994), King *et al.* (1975), Lekagul & Round (1991), MacKinnon & Phillipps (1993), Medway & Wells (1976), Moleworth (1955), Riles (1958), Smythies (1981, 1986), Thiollay & Meyburg (1988), van Marle & Vrous (1988), Wilkinson *et al.* (1991a, b).

## 271 WHITE-FRONTED FALCONET *Microhierax latifrons* Sharpe, 1879

Plate 91

Other name: Bornean Falconet

**DISTRIBUTION** Indomalayan (7°N to 5°N); order 4; said to be fairly common within restricted range. Endemic to north Borneo: northeast Sarawak (north from Lawas) and Sabah (north from Sarawak border in west and Telukan Lahad Datu, formerly Darvel Bay, in east).



**MOVEMENTS** Sedentary.

**HABITAT** Forest clearings with dead trees, also at forest edge and in cultivation with scattered trees. Perhaps especially on montane slopes, but sea-level to 1,200 m.

**FIELD CHARACTERS** Minute shrike-like falcon, plain black above but for white or coloured forecrown and

mainly pale below, like Black-thighed [270] in size and shape, again relatively shorter-tailed than Collared Falconet [269] of southeast Asia. Conspicuous perching evidently comparable, but behavioural and ecological differences inadequately known. Sexes similar except in colour of forecrown, though female averages 9% larger, and 4% longer-tailed; juvenile also quite similar, but distinguishable in fair view.

**PERCHED** All plumages Whole forecrown to rear level of eyes uniformly white, or chestnut, or buff; no collar. **Adult male** Forecrown white; otherwise all slightly glossy black above, including mask, triangular extension on neck-sides, and whole tail; below, white throat, lower cheeks and breast, shading into tawny wash on belly and crissum, but black flanks and outside thighs. **Adult female** As male, except whole forecrown rich chestnut. **Juvenile** Similar, but forecrown and cheeks suffused tawny-buff (unclear whether also pale edges to back and wing-coverts in fresh plumage); females may show some rufous-chestnut on forecrown at early stage. **Bare parts** Eyes brown. Cere and legs dark slate to black.

**FLIGHT** Tiny, compact falcon with shortish pointed wings, squarish-ended tail; wingspan 2.0 times total length. Fast beats; action probably as Collared Falconet [269]. **Adult** Uniformly black above, including spread tail, apart from white spots which may be visible on inner secondaries, and distinctive forecrown of white (male) or chestnut (female) over black mask; below, white throat, lower cheeks and breast, tawny belly and crissum, black flanks and outside thighs, black-flecked white

**VOICE** 'Shrill scream; also a low chattering call. A prolonged hiss when angry' (Ali & Ripley).

**FOOD** Mainly large insects, especially butterflies, dragonflies and grasshoppers, and some birds, mostly caught in flight; more rarely, 'mammals, lizards and some insects on the ground' or 'possibly also mice and lizards'. Like other falconets, watches from open perch with good view, usually high, often above canopy or by stream, and dashes out to grasp prey in air; may also snatch from flowers or foliage. Often eats insect on wing or, if too large, circles around and sails back with it to same or different perch; but usually changes perch frequently. Bird prey recorded includes 'scimitar-babbler *Pomatorhinus*, thrush *Turdus*, sparrow *Passer* and swallow *Hirundo*', but this biggest of the falconets sometimes stoops 'on birds much larger than itself just like the true falcons *Falco*, killing them by striking with the hind claw' (Ali & Ripley).

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs, occasionally small family or hunting groups. No aerial displays recorded.

**BREEDING** Little known. March–May, but roosts in same sites at other times. Breeds (and at other seasons roosts) in old nest hole of barbet (Capitonidae) or woodpecker, even on underside of branch, at 10–30+ m in usually dead tree; no material added other than insect remains. Clutch size and incubation and fledging

periods unknown, though usually 3–4 fledglings.

**POPULATION** Range extends over more than 1.5 million km<sup>2</sup>, but much of that is in regions of serious deforestation. Though locally still 'fairly common', general impression is that this species is much less numerous than the other two more widespread falconets, with a population perhaps only in the upper thousands and not even reaching five figures. Nevertheless, like other falconets, it is tolerant of disturbance and adaptable to man-made habitats (e.g. tea plantations), where further helped by its small size.

**GEOGRAPHICAL VARIATION** Monotypic, but white parts of head pattern variable. Typically, thin white frontal line continues as supercilia that curve down and broaden slightly to join white of neck-sides, but sometimes the frontal strip is missing, so that the forehead is black, in which case the supercilia may begin just above or behind the eyes; rarely, in south China, the white of the neck-sides may extend back into a very thin and inconspicuous line across the back of the neck.

**MEASUREMENTS** ♂ wing 108–116 mm, ♀ 111–121 mm; ♂♀ tail 65–74 mm, tarsus 20–27 mm. **Weights** 55–75 g (HBW).

**REFERENCES** Ali & Ripley (1978), Cheng Tso-hsin (1987), Etchécopar & Hùc (1978), Grimmett *et al.* (1998), King *et al.* (1975), Meyer de Schauensee (1984), Ripley (1982).

## Family Falconidae (b: typical falcons)

### 274 BROWN FALCON

*Falco berigora* Vigors & Horsfield, 1827

Plate 103

Other names: Brown Hawk, Cackling Hawk

**DISTRIBUTION** Australasian (2°S to 45°S); order 6+; widespread and common to very common. Endemic to Australia and New Guinea: throughout Australia and Tasmania, including such offshore islands as Melville, Groote Eylandt, Fraser, Flinders, King and Kangaroo; and most of mainland New Guinea (both Irian Jaya, except for 'head and neck' of western end, and Papua) and some of its offshore islands (at least Manam, Karkar, Long Island and Umboi, all off north coast of Papuan part).

**MOVEMENTS** Adults generally sedentary, but sometimes nomadic, immatures dispersive; although tendency for numbers to increase in northern Australia during austral winter, no clear pattern emerges and, while certain southern areas show corresponding decreases, others have increases. Many juveniles cross Bass Strait in autumn. Some movements may be more related to drought or food. Longest ringing recovery 2,047 km northwest from South Australia; otherwise 410 km northwest within South Australia and, more interestingly, 406 km from Victoria across Bass Strait to Tasmania.



**HABITAT** Almost anywhere except rainforest and dense eucalyptus: coastal dunes, interior desert, low scrub, roadsides, treeless grassland, farmland and any other open country, savannah, woodland or secondary growth, forest edge or clearings, and, in New Guinea, forested mountain valleys and native cultivation. Sea-level to c2,000 m in Australia, to 2,800 m or, occasionally, 3,000 m in New Guinea.

**FIELD CHARACTERS** Largish, scruffy-looking falcon, variable in plumage at all ages but always round-shouldered and pot-bellied, with big head, loose plumage, long legs and small feet. Spends much of day perched and seldom flies far; perches conspicuously on tree tops, dead branches, telegraph poles, fence posts, buildings or rocks, often along roadsides, and shape distinctive even when seen from moving vehicle; wing-tips equal to well short of tip of rounded tail. Polymorphic and individually very variable, with three main morphs recognised (but many intermediates) and regional and ecological differences in ratios of those (see Geographical Variation). Sexes otherwise similar, but, despite slight overlap in full range of linear measurements, female may be up to 26% larger, also averaging 35–37% and 45–46% heavier in winter and summer respectively (see Measurements); juveniles of brown and rufous morphs distinguishable from adults, but of true dark morph generally only in hand.

**PERCHED** **Brown adult** All brown above (varying from light brown to chocolate) with fine rufous edges, spots and tail-bars, and blackish shaft-streaks on head; buff to greyish-white forehead, face and supercilia set off dark moustaches and ear-coverts that nearly enclose pale cheek-patch; usually white or cream below, plain on throat and crissum, but otherwise variously marked with finely to heavily dark-streaked breast, brown-blotched or brown flanks, and more or less brown thighs, but sometimes shaft-streaks extend to undertail-coverts or (particularly females) whole breast almost solidly brown.

**Rufous adult** Rather similar in pattern, but basically sandy-brown to red-brown above, with pale areas of forehead and face rufous-buff, and rufous-buff to pale rufous below; underbody again streaked or blotched, but undertail-coverts usually barred and belly-centre and flank-spots variably whiter. (Females of both brown and rufous morphs tend to be the more heavily marked below.) **Dark adult** All black-brown (humid regions) to dark sooty-brown (arid interior) with indistinct rufous tail-bars and flank-spots, sometimes traces of typical head pattern or barred undertail-coverts. **Brown juvenile** Mainly dark brown; head and tail patterns comparable to adult, but light parts of head buff and broad buff collar; clearer rufous edges above; buff to cream mottling on central areas of breast, belly and undertail-coverts. **Rufous juvenile** Similar to brown juvenile, but paler areas more rufous and no collar. **Dark juvenile** Like dark adult apart from rufous edges above and lack of rufous flank-spots, but some have more patterned head and paler crissum. **Brown and rufous immatures** Generally (not always) become whiter or more rufous-buff during second year (?), this change proceeding forward from tail-coverts and progressing more rapidly on males; juveniles moult in second autumn and not, like adults, in spring/summer. **Bare parts** Eyes brown (adult rarely hazel). Adult cere, eye-rings and feet all

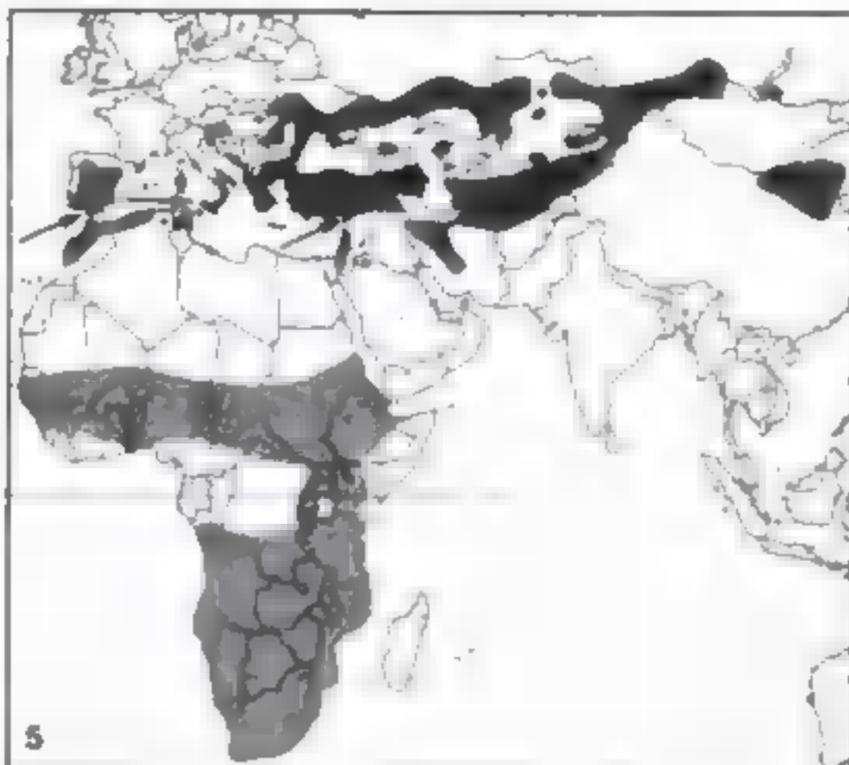
pale grey to whitish (rarely dull yellow), juvenile pale blue-grey.

**FLIGHT** Smallish to medium-sized raptor with prominent head, longish but relatively blunt-tipped wings, frequently with fingers showing, and heavy-looking rounded tail; wingspan 2.2 times total length. Often characteristically slow heavy beats with loose rowing action, and erratic jinking and sideslipping, interspersed with rather harrier-like glides on raised wings, but pursuit-flight rapid with backswept wing-tips and short stiff beats, jerky and erratic with deep exaggerated downstroke even momentarily held at bottom, not flickering like faster falcons; soars with either kinked carpal and upswept tips or true modified dihedral, curved trailing edges, often fanned tail; hovers clumsily or hangs on wind. Great variety of plumages discussed above: sandy-brown through brown and red-brown to nearly black above, with at most indistinct rufous markings, and anything from largely white or rufous to blackish-brown below, paler morphs usually with dark-streaked breast and brown flanks and thighs. Wing-linings may be white or rufous with very variable brown streaks or blotches (pale and rufous adults) or solidly brown (juveniles and dark adults), but all morphs and ages have pale (whitish to cinnamon-brown) flight-feathers and tail all finely but clearly barred, and primaries dark-tipped.

**CONFUSION SPECIES** Shape, flight, walk, voice and behaviour distinctive, along with barred undersides of flight-feathers and tail, while all except dark morph have characteristic dark stripes enclosing pale cheek-patches. Dark morph often misidentified as Black Falcon [302], though that has smaller head, broader shoulders, shorter legs (by 25%) and large feet; in flight, more pointed wings and narrow, square-tipped, tapered tail, both much more uniform below, and faster action with glides on slightly down-tipped wings. Immature Peregrine Falcon [309], apart from quite different shape and flight, has dark cheeks, evenly streaked underbody and barred wing-linings. Female and juvenile Australian Kestrel [282] smaller and shorter-legged, more rufous and spotted above, all paler and more finely streaked below, with subterminal tail-band, winnowing flight, fast hovering, flat glides. Immature Brown Goshawk [119] has shorter rounded wings, quite different flight, behaviour and head pattern. Compare also rufous morph with Red Hawk [156] and juveniles with Australasian Marsh Harrier [101].

**VOICE** Noisy, with parrot-like calls and screams throughout year, even well away from nesting area, often particularly at dusk. Main call highly distinctive: loud raucous cackling or crowing, variously likened to 'demented hen' or described as rattling chatter and harsh parrot-like screeching. Quieter clucks and croaks used in contact, and male bringing food utters harsh grating *ker...ker*. Cackles also when flushing prey from cover.

**FOOD** More terrestrial prey and smaller birds than Black Falcon [302]. Small mammals, insects, fair number of reptiles (snakes as well as lizards), birds and carrion, all in seasonally varying proportions; other invertebrates and fish, frogs and crustaceans also recorded. In Tasmania, mammals (30%), carrion (30%) and birds (20%) predominate in winter, and insects (40%)



and south Russia to north and central Mongolia, and, in south, from Albania, Macedonia and Greece through Turkey to Armenia and Georgia, with isolated populations in Syria (probably extinct), Israel, Palestine, Jordan and north Saudi Arabia (small colony discovered in 1990), and from Azerbaijan and west and north Iran in narrow band eastward through northernmost Afghanistan and central China (east to Shanxi) to south Mongolia. Formerly more extensive range in Europe northward to Czech Republic and south Poland, and in Asia east to northeast China.

**MOVEMENTS** Apart from small numbers of adults present year-round in southern part of breeding range (e.g. Morocco, south Spain, across to Turkey and Azerbaijan), and few which move only as far as Middle East, almost entire population migrates to Africa, in variably sized flocks, often mixed with other small falcons such as Common Kestrel [277] and the two red-footed falcons [289, 290]. Juveniles leave European colonies within week of fledging, and in June–July disperse widely (often northward), as do adults, before migration proper begins late August–September, crossing Mediterranean (peak early October) on broad front, usually at high altitude and so scarcely apparent (maximum 460 Common/Lesser over two-month period in autumn at Kafr Qasim, Israel, and at Straits of Gibraltar 545 in 1972 only minute fraction of contemporary Iberian numbers; see Population), and reaching northern tropics of Africa – then more visible at lower altitudes – through October–November, having presumably made single non-stop flight of 2,400+ km; whole Asiatic population travels west and southwest, high up with other small falcons, vast majority entering Africa at eastern end of Mediterranean, having covered distance of up to 11,000 km, but smallish numbers regular on passage and during winter through Indian subcontinent, including Maldives, and, although accorded status of vagrant in Seychelles, some eastern breeders probably cross Indian Ocean on more regular basis (cf. partly sympatric Eastern Red-footed Falcon [290]). While some birds nomadic within northern tropics, most move on south in October–November to main winter quarters in grasslands of Botswana, west Namibia and north and east South Africa, extending farther west during locust plagues;

many juveniles apparently remain in Africa for year or more before returning to breeding areas. Northward return generally at lower altitudes, more leisurely and thus more obvious, small flocks moving up through West and East Africa from late January onwards and many arriving at Mediterranean coast mid February, and in south Europe in March, with passage also through Middle East (formerly large numbers through Egypt, Iraq and Kuwait, and record of 1,000 crossing central Red Sea in one hour), and arrival in Russia in April; but many do not leave southern Africa until March, probably mostly east Asiatic birds as Mongolian breeding grounds not reached until mid May. Overshooting spring migrants and post-breeding dispersers recorded north to Britain and Fennoscandia (including rather late records in October and November in Denmark), on east Atlantic islands and in Japan.

**HABITAT** Prefers dry, open country with plentiful insects and with warm to hot climate, generally avoiding humid and more vegetated habitats; breeds in desert and semi-desert, steppes and lowland plains (so long as no more than lightly cultivated), mostly near or within villages or other human settlements, including church and cathedral towers in towns and cities (e.g. Sevilla, Spain), though also around steep cliffs and rocky slopes; in African non-breeding range dry savannah and similar pure grassland habitat, in southern Africa especially highveld and Karoo steppe, extending into dry wooded savannah and many other types of lightly wooded terrain, but still avoiding humid areas; communal roosts often in groups of trees, or in buildings, sometimes other sites (e.g. power pylon). Sea-level to lower hills, mostly below or well below 500 m, but locally to 1,000 m and in Asia to 1,500 m; on migration sometimes higher (e.g. to 3,700 m in Nepal).

**FIELD CHARACTERS** Small to mid-sized, slim falcon, male unspotted chestnut above with blue-grey head, wing-panels and black-ended tail and lightly spotted on breast, female and juvenile very like those of Common Kestrel [277] (see Confusion Species), all long-winged and long-tailed with smallish bill, medium-long legs and pale claws (cf. Common Kestrel). Diurnal, occasionally nocturnal at artificial lights; perches upright, at times more obliquely, and openly, on wire, wall, bare tree branch, cliff, building or the like; often descends to ground (much more so than Common Kestrel), where walks and runs freely; wing-tips equal to or just short of tail-tip. Sexes distinct, and scarcely larger (though bulkier female can average up to 30% heavier; juvenile distinguishable; as adult by second winter; some breed at one year, but most not until two years or older).

**PERCHED Adult male** Plain chestnut upperparts with dark blue-grey wing-panels (greater coverts, outer medians and tertials, but variable in extent) offset blue-grey head and tail (grey rump normally hidden at rest), latter with white tip and broad black subterminal, and black primaries; head can show faint indication of darker moustaches, very rarely even paleness on cheeks, though in neither case ever approaching facial aspect of Common Kestrel [277]; apart from whitish throat, salmon-buff underparts paling towards crissum and variably but usually lightly spotted black (spots can be sparse and virtually restricted to flanks or cover entire

breast and flanks). **Adult female** Streaky head, barred rufous upperparts and (greyer) tail, and streaked underparts all like Common Kestrel (and as with that species some can have greyer tinges on head), but following differences usually apply: head rather plainer, less boldly streaked, with thinner moustaches therefore more prominent and often accentuated by paler cheek-patch extending up behind each eye (no dark line behind eyes as on many Commons), dark bars on upperpart-feathers narrower and shaped more like arrowheads (close view needed, and some Commons similar), and on average paler underparts with finer spots and streaks; in very close view, of course, pale claws clinch identification. **Juvenile male** Like adult female but paler (though often more rufous than juvenile Common Kestrel), with broadly pale-tipped feathers on upperparts, especially upperwing-coverts and flight-feathers, and more streaked than spotted underbody; variable degree of grey on rump to tail, tail occasionally even virtually unbarred, but some, like young females, have this region rufous-brown. **Juvenile female** Much as young male, but never any grey tinge; barring on tail generally stronger and more regular, and on scapulars and wing-coverts broader. **First-summer male** Pale feather-tips worn away by first winter, and, with partial but usually extensive moult of body and head starting November-December, and fore upperwing-coverts and usually tail-feathers also replaced, much more like adult; aged by retained barred juvenile greater coverts (normally no grey on wing, though birds in advanced moult already have some new grey greater) and, if present, juvenile outer rectrices. **First-summer female** Often impossible to distinguish from adult except by contrast between new upperpart-feathers and worn juvenile wing-coverts, but some also moult new central tail-feathers (protrude beyond abraded juvenile outers). **Bare parts** Eyes dark brown. Adult cere, orbital rings and legs bright yellow, juvenile often duller. Claws whitish (Common Kestrel black).

**FLIGHT** Small raptor with long, rather narrow, pointed wings looking rounder-ended and relatively shorter and broader when soaring (juvenile wings always slightly shorter, more rounded at tips), and fairly long, thin and rounded or wedge-tipped tail (sometimes projecting central feathers); overall shape more like Western Red-footed Falcon [289] than Common Kestrel [277], proportionately shorter-tailed and perhaps less slim-looking than latter; wingspan 2.4 times total length. Flight with fast, rather flat beats and intervening glides, agile and skilful even in more enclosed spaces; soars and glides like Common Kestrel, also hovers in similar manner though, in general, less persistently and less frequently; on other hand, is even more accomplished in exploiting upcurrents, floating and kiting for long periods. **Adult male** Distinctive colourful pattern above of plain chestnut back and lesser and median wing-coverts, darkish blue-grey head and inner wing-diagonal (greater coverts, some medians and tertials, though extent variable) and blackish outer wings contrasting pale blue-grey rump and tail, latter with black subterminal band and thin white tip; below, generally unbarred whitish underwings with extensive blackish ends and dusky trailing edges, white throat and whitish-grey tail with broad black subterminal and thin white tip (central feathers untipped) all contrast darker salmon-buff breast that

merges into paler crissum, only other markings below being small black spots on wing-linings, breast and flanks (all independently variable in extent and heaviness, at times imperceptible). **Adult female** Very like Common Kestrel, including greyish rump and barred greyish or rufous tail, and often impossible to separate by plumage; in close view, look for Lesser's slightly plainer head (thinner moustaches thus more obvious, especially if also whiter cheek-patches reaching up behind eyes), relatively narrower dark barring above and, importantly, from below, its paler and less clearly barred primary bases contrasting more with dark-spotted linings and broad dusky wing-tips and trailing edges, also on average narrower spots/streaks on paler underbody; but some birds distinguishable only by shape (see above, and Confusion Species). **Juvenile** Often difficult to separate from adult female: more streaked than spotted appearance below and, in fresh plumage, broad pale feather-tips on paler ground colour above perhaps best clues (sexual differences described under 'Perched'). **First-summer male** Differs from adult in much less or no grey on upperwings (greater coverts instead barred rufous) and sometimes retained juvenile barred outer tail-feathers; below, less contrast between pale primary bases and darker tips.

**CONFUSION SPECIES** Adult male unmistakable in reasonable view, and first-summer male confusable only with adult male Common Kestrel [277], but females and juveniles very like Common, especially of nominate race, and, while more gregarious habits of Lesser a clue, best distinguished by shape and proportions (in direct comparison Lesser's shorter tail should be obvious); see preceding paragraphs, and Confusion Species under Common; important to note also that (contrary to many published texts) Lesser's longer outermost primary gives more rounded wing-tip than on Common Kestrel (see fig. 56), and when hovering it also appears to have more ponderous belly, but good experience often needed to appreciate these differences. Otherwise, when soaring with spread wings looking broader and rounder-ended,

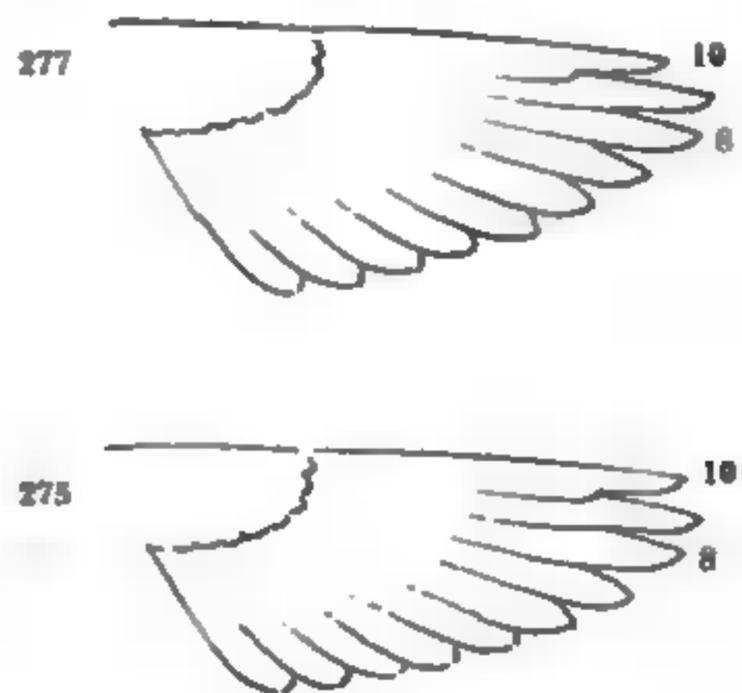


Fig. 56. Wing-formulae to show relative lengths of the outermost p10 of Common Kestrel *Falco tinnunculus* [277] (clearly shorter than p8) and Lesser Kestrel *F. naumanni* [275] (roughly equal to p8). Contrary to many published texts, this gives the latter the more rounded wing-tip.

male in particular can be mistaken for Levant Sparrowhawk [114] (more uniform-looking underbody and linings, bigger and more obvious dark wing-tips, fully and evenly barred tail lacking broader subterminal). Other confusable species much as for Common Kestrel (which see).

**VOICE** Mostly silent except when breeding, then often noisy. Distinctive contact call high-pitched, hoarse, rasping *chay chay* or *chee-chee*, often in chorus at colony; when agitated more as *tsek tsek...* or *kekiki...*, similar to Common Kestrel [277] but somewhat faster. Also trilled begging call very like that of Common, whining food-call mostly by female, and various hisses and short harsh notes at nest.

**FOOD** Primarily large insects, which often over 90% of prey and, in summer, even 100% locally, and other arthropods; few vertebrates (possibly more prominent during courtship feeding), mainly small lizards, some small mammals, small passerine birds and fledglings, rarely amphibians. Wide variety of insects, both aerial and terrestrial, but everywhere predominantly orthopterans and beetles, former at times almost to exclusion of other prey and latter particularly important in early spring, though this is an opportunist feeder that takes advantage of local abundances of food, so dragonflies and other aerial insects can be well represented in diet; in African non-breeding quarters, commonly exploits swarms of alate termites and ants, capturing huge numbers. Among other arthropods, centipedes (especially the large Scolopendra) quite frequently caught when numerous, and fewer millipedes, spiders and scorpions; earthworms not uncommon. Reptiles mainly lizards, which can be important in spring in northern range (e.g. Mongolia) before insects available, and skinks and geckos; rarely, small snakes. Mammals primarily rodents (mice, voles, but occasionally to size of common rat *Rattus norvegicus*), and some shrews (Soricidae). Birds almost always small fledglings or nestlings, particularly of ground-nesting passerines such as larks (Alaudidae). Forages by flying low, at up to 15 m, and turning into wind, kiting or, usually briefly, hovering, regularly circling around to repeat process at new station; swoops on prey in air or on ground. Also hawks aerial insects, and will prey on insects attracted to lights at night; exploits prey disturbed by large mammals or by farming activities. Still-hunts less often, though more so in still weather, and not infrequently hunts on foot (e.g. for earthworms, beetles, flightless orthopterans). Food piracy not uncommon at breeding colony. Will feed at up to 10 km or more from colony, females generally farther than males. Gathers in flocks at insect swarms, and at grass fires, large numbers assembling from wide area on African non-breeding grounds to take advantage of such temporarily abundant food sources.

**SOCIOSEXUAL BEHAVIOUR** Gregarious, but at times solitary; breeds in colonies of up to c250 pairs (usually 5–30, sometimes solitary pairs), sometimes mixed with Common Kestrels [277]); forages in flocks of up to 1,000+ (now more usually three-figure flocks in Africa, and on Spanish breeding grounds 40 or fewer); migrates in flocks of tens to low hundreds (sometimes larger; see Movements); and roosts communally in aggregations of up to several hundreds and more. (In past, when this

species far more numerous, many colonies of hundreds of pairs, passage flocks of thousands recorded, and roosts of 1,000+ birds common in Africa.) In south Spain, urban colonies larger (2–200 pairs) than rural ones (1–40 pairs); occasional polygyny recorded, but secondary female usually deserted before laying stage; helpers at nest (year-old males) observed in north Spain (exceptional among raptors). Again in Spain, solitary foraging found to be normal from egg-laying until fledging stage. Aerial displays similar to those of Common Kestrel [277], including rolling-flight by male to show upperside and underside alternately; advertising males display in flight among other birds wheeling around colony, prey-carrying male passing in front of his selected nest site; communal aerial displays at dusk often very noisy, with soaring and mutual chasing by up to dozen or more birds. Much interspecific aggression at colonies, where intruders also attacked.

**BREEDING** May–July, but often from late April in southern range and up to a month earlier, from late March, locally (e.g. Israel). Slight unlined scrape in cavity, typically high up in man-made structure ranging from large or old building (church, cathedral, castle, abandoned farmhouse), ruin, and under roof tiles of big house, to old walls, but quite often in abandoned quarry, in cliff face or bank, and locally near ground among pile of stones (e.g. La Crau, south France, and Turkey); use of holes in willow *Salix* also recorded, and in Ukraine and Caucasus often old corvid nests in trees; nestboxes accepted if suitable. Clutch 3–5 (2–6). Incubation 25–28 days. Fledging typically c36 days, but in Iberia up to 40 days apparently the norm (average 37 at one Spanish colony, c40 in Portugal) while, conversely, much shorter period of 26–30 days reported for Israel; dependence 5–8 days, rarely only 2.

**POPULATION** Catastrophic decline throughout western half of range and, perhaps less markedly, in eastern half, too, began in 1960s and accelerated through following two decades. Scale of this best illustrated by figures for Spain, where estimated population of 100,000 pairs, possibly more, in early 1960s had more than halved, to 20,000–50,000, in 1980, and plummeted to a mere 8,000 by 1994 (1989 estimate of 4,200–5,100 considered too low). This picture is mirrored in rest of Europe and western Asia, where range has also contracted considerably since first half of 20th century; thus no longer breeds in central Europe (e.g. extinct Czech Republic, Slovakia, Austria and, since mid 1990s, Hungary, and no longer breeds in southern Ural region or north Kazakhstan), and, outside Spain, only a handful of countries now have numbers of breeding pairs exceeding three figures (Morocco c1,000, Italy possibly 2,100+, Greece 2,700–3,200, Turkey perhaps 3,500, Azerbaijan 2,000+, Kazakhstan up to 2,000), and only some half-dozen others hold 100–800; in most cases, these represent massive reductions from pre-1950s populations (e.g. c400 pairs in Israel in late 1990s, down from 3,000+ – possibly twice that or more – in 1940s). Total breeding in west Europe and north Africa at end of 20th century put at 17,000–21,000 pairs (well over a third of those in Spain), which amounts to decline of over 90% since 1950s. Although no reliable figures available for most of Asia, this falcon seems to be at best uncommon there and, owing to colonial breeding, generally occurs in widely scattered

pockets, and all available evidence suggests rather low total unlikely to exceed, say, 5,000–10,000 pairs in all, probably following decline similar to that recorded in west. This supported by figures from African non-breeding grounds: estimated maximum total of 50,000–60,000 individuals in 1990s in South Africa (where vast majority of Palearctic population winters) is equivalent to decline of more than 50% since late 1960s. Decline initiated by radical land-use changes and degradation of habitat in both breeding and wintering areas, with downward trend in numbers running in tandem with abandonment of traditional farming methods, and intensification of agriculture, coupled with widespread use of pesticides, all leading to greatly reduced prey populations and constriction of foraging areas available to this insectivorous falcon; further exacerbated by loss of nest sites through modernisation or demolition of old buildings, as well as increased human disturbance at colonies. While conservation efforts have allowed some local recovery, as in southeast Italy (Puglia-Basilicata, where population grew from 90–110 pairs in mid 1980s to 777–1,023 in 1994) and south France (from three pairs in 1980s to 60 in 2000), and numbers appear to have stabilised in other places, species remains vulnerable in most of range. Studies of a ringed population in Spain revealed annual survival of 71% (61–83%) for adults and c34% for first-years; but nestling mortality from starvation can be very high (various studies give average annual productivity c2 young per pair), not all adults breed every year, and majority of immatures do

not nest until at least two years old. Such factors as survival of adults and juveniles and, in this case, age of first breeding, would seem crucial to maintenance of a viable population.

#### **GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 228–246 mm, ♀ 224–258 mm; ♂ tail 133–154 mm, ♀ 138–158 mm; ♂ tarsus 29–32, ♀ 30–33 mm. **Weights** ♂ 90–172 g, ♀ 128–216 g.

**REFERENCES** Ali & Ripley (1978), Andrada & Franco (1875), Barnes (1993), Beaman & Madge (1998), Bernis (1980), Biber (1990, 1996), Bijlsma *et al.* (1988), BirdLife International (2000), Blondel (1964), Brazil (1991), Brown *et al.* (1982), Bustamante & Negro (1994), Cade (1982), Cheng-Tso-hsin (1987), Collar & Andrew (1988), Cramp & Simmons (1980), Crick & Jones (1992), Davygora (1998), Dementiev & Gladkov (1951), Donazar *et al.* (1992, 1993b, 1994), Flint *et al.* (1984), Forero *et al.* (1996), Forsman (1999), Franco (1980, 1982), Franco & Andrada (1976), Génsbol (1986, 1995), Glutz von Blotzheim *et al.* (1971), González & Merino (1991), Grimmett *et al.* (1998), Hagemeijer & Blair (1997), Handrinos & Akriotis (1997), Hiraldo *et al.* (1991, 1996), Kemp & Kemp (1998), Knystautas (1993), Negro (1991, 1997), Negro & Hiraldo (1992, 1993), Negro *et al.* (1991, 1992, 1993), Parr *et al.* (1995), Piechocki *et al.* (1981), Pomarol (1993), Porter *et al.* (1981, 1996), Richardson (1990), Roberts (1991), Rogacheva (1992), Shirihai (1996), Shirihai & Christie (1992), Shirihai *et al.* (1996), Shubb (1993a), Siegfried & Skead (1971), Smalley (1983), Svensson *et al.* (1999), Taylor (1984), Tella *et al.* (1994, 1996), Tuckey & Heath (1994), Zimmerman *et al.* (1996), Zollinger & Hagemeijer (1994).

## **276 AMERICAN KESTREL**

### *Falco sparverius*

**Plate 98**

Former names: Sparrow Hawk, American Sparrowhawk

**DISTRIBUTION** Nearctic and Neotropical (68°N to 57°S, winter 51°N to c50°S); order 7; widespread and very common to uncommon throughout most of North America, though rare in southeast, reasonably common in rest of range, and generally stable despite some local decreases. Breeds North, Central and South America, and West Indies: from central Alaska and southern Canada (north-central Yukon southeast to northwest Saskatchewan, eastward across central and east Ontario and south Quebec to Anticosti Island and southwest Newfoundland) south through USA (except south Texas and much of Louisiana), throughout Caribbean islands (rare in Lesser Antilles south of St Lucia) and, in west, Baja California and down through Mexican highlands to central Honduras and north Nicaragua; then, apart from higher parts of Andes, breeds over most of South America (absent from Amazonian rainforest and from east Brazil's Atlantic forest) south to Tierra del Fuego, and including Robinson Crusoe Island [formerly Más a Tierra] in Juan Fernández group, off Chilean coast.

**MOVEMENTS** Although resident, even largely sedentary, in most of range, populations breeding in far north and extreme south are migratory. Thus, those of Alaska and most of Canada and northern USA move southward in August–September, juveniles preceding adults, on broad front but often in small to larger groups, and



spread out widely over rest of continent, with some concentrations as in southwest Ontario (highest September–November total 5,750) and at New Haven, Connecticut (mean autumn total 3,620, maximum 7,220), while at Cape May, New Jersey, unprecedented 24,000+ estimated on single day in mid October 1970 after passage held up for nine days by adverse winds;

North American race) and usually about three black bars on outer rectrices; apart from whitish throat, entire underparts uniform plain rufous. **Dark-morph adult female *sparveroides*** Head pattern, including reduced extent of white on cheeks, similar to dark male, unless crown streaked and not so dark; apart from blackish-brown primaries, rest of plumage all rich dark rufous, heavily dark-banded above, tail with about seven to eight dusky bars and broader subterminal band, and variably but usually rather lightly streaked/spotted below, where markings strongest on flanks. **Juvenile *sparveroides*** Similar to adult of respective morph and sex, differing only in showing thin dark streaks on crown and on breast. **First-winter (all races)** Identical to corresponding adult but for retained, worn juvenile flight-feathers (which replaced in complete moult in first-summer/second-autumn). **Bare parts** Eyes dark brown. Cere, eye-rings and legs orange to yellow, juvenile somewhat paler. **FLIGHT** Small, rather compact, colourful raptor with moderately long and conspicuously narrow-looking wings pointed at tips (blunter when spread in soaring), longish round-ended tail; wingspan 2.3 times total length. Active flight light and buoyant with weak-looking beats not very deep, but swifter and with beats faster and even shallower when pursuing birds in low flight (cf. Merlin [294]); glides on level wings or with wrists lower than body and wing-tips curved upward; soars on flat wings, tail often fanned; regularly hovers with rapid flapping, or, in stronger winds, hangs motionless in air, kiting. **'Typical' adult male (mainly North America)** Above, grey crown (rufous central patch, if present, not always obvious) and rufous nape with two black spots distinctive, as is combination of rufous body (variably dark-banded on back and scapulars), blue-grey forewings (often spotted blackish) and blackish flight-feathers (sometimes white spots visible near trailing edges of primaries), and plain rufous rump and tail, latter with broad black subterminal band and thin white tip and, when spread, black-banded paler outer rectrices (though tail very variable, from whitish to blackish and sometimes with additional thin bars; see 'Perched'); below, white cheeks with two vertical black stripes often noticeable, otherwise underbody whitish to deep rufous, spotted or blotched on lower breast and, especially, flanks, whiter and unmarked on lower belly to thighs and crissum, against which usually paler-looking wings have buff-white linings spotted black and pale grey remiges banded dark grey, with row of small white circles inside darker trailing edges (striking when wings strongly backlit), while broad black subterminal band generally very obvious against typically plain rufous rest of tail (pattern/colour variable; see above). **'Typical' adult female** Head like that of adult male but paler; apart from outer wings, which blackish, entire upperparts, including wing-coverts and tail, reddish-brown with dark brown barring, tail also having broader dark subterminal band and narrow pale tip; below, white throat and white cheeks with two vertical black stripes obvious at closer ranges, but otherwise generally pale rusty appearance as creamy to pale rufous-buff underbody (except for plain white thighs and crissum) and wing-linings (except for barred greater coverts) all heavily streaked rufous, pale flight-feathers as male but washed rufous (row of paler circles on trailing edges

less noticeable than on male), and light rufous tail also barred dark brown with broader subterminal. **Pale-morph adult male *sparveroides*** (southern Bahamas south to Jamaica) Looks much paler than 'typical' adult male: above, white forehead and black nape-spots visible in close view, and plain rufous upperparts and tail, latter with white tip outside narrow black subterminal, strongly contrast plain blue-grey forewings and black hands; below, thin black cheek-stripes stand out against conspicuously white and unpatterned underbody, on which chest-sides washed light rufous, and underwings similarly white-looking with darker-banded remiges. **Pale-morph adult female *sparveroides*** Head pattern much as pale male; otherwise, entire upperside as 'typical' female (dark-banded rufous, blackish hands), but underside much paler-looking, more creamy-white, with rufous streaking on body limited to breast-sides and greatly reduced on wing-linings. **Dark-morph adult male *sparveroides*** Much darker and more uniform, with smaller and greyer cheek-patches less striking; above, all dark slaty with perhaps browner-tinged scapulars, and blacker hands, except for contrastingly rufous rump and tail with relatively narrow black subterminal tail-band and, when tail spread, black-banded outer rectrices; below, apart from whitish throat bordered by black moustaches, and barred greyish flight-feathers, all uniform dark rufous with tail pattern as above. **Dark-morph adult female *sparveroides*** Grey crown (often streaked) and blackish primaries the only real contrast above against heavily dark-banded rich rufous of rest of upperside, where tail shows about seven to eight dusky bars and broader subterminal band; largely dark rufous below, too, with usually light streaks/spots strongest on flanks and wing-linings, but flight-feathers paler, greyish, and fully dark-banded. **Juveniles (all races)** Very like adults in flight, and often difficult to age: males of 'typical' forms generally differ in having mantle (as well as back) barred, and breast well streaked black on paler ground colour; young females often indistinguishable in flight from adults, although some may have dark subterminal tail-band comparatively narrower. Juveniles undergo more or less complete moult of body and coverts two to three months after fledging and then appear even more adult-like, but retained juvenile flight-feathers increasingly worn and paler until replaced one year later.

**CONFUSION SPECIES** Combination of small size, distinctive plumage pattern and coloration (especially white cheeks contrasting with two black vertical stripes, plain or barred reddish to rufous back and tail) and regular kiting or hovering makes confusion with other raptors very unlikely. In Nearctic, similarly sized Merlin [294] could conceivably be mistaken in typically brief view, but fast low flight, though sometimes performed by American Kestrel, is much more characteristic of Merlin (different head pattern, both sexes all dark above, no rufous, shorter tail blackish-looking with grey bars, well streaked below, more agile flight, rarely hovers); and in West Indies migrant Merlin easily distinguished from slaty-backed race *sparveroides* of American Kestrel by its lack of rufous on tail and paler well-streaked underparts. In Central and South America, again no other raptor similar enough to cause real problems: Bat Falcon [299] comparable in size but easily distinguished (sturdier, very dark above and below,

broad whitish throat, neck-sides, deep rufous thighs/crissum, different flight behaviour), and smaller Pearl Kite [23], if similar in shape and behaviour, confusable only in very briefest of views (relatively shorter wings and tail, blackish above, white trailing wing-edges, yellowish forehead and cheeks, thin hind-collar, white below, rufous thighs/flanks). Vagrants of nominate race appearing in Europe distinguished from Common and Lesser Kestrels [277, 275] by smaller size, head pattern, and male's wing-covert and tail patterns.

**VOICE** Vocal at all times, and especially noisy when breeding. Usual call, used in various contexts from territorial assertion to displeasure, a series of five or more spaced *klee* notes, also rendered (less accurately) as *kilth*, female usually lower in pitch; sometimes fewer notes, and speed of delivery varying from rapid to slower. Fast chattering in interactions between pair-members; during courtship protracted whine, usually rising, by both sexes, also by female and fledglings when begging and then normally more intense, evenly pitched and longer.

**FOOD** Mostly insects, small mammals and reptiles, proportions varying seasonally and regionally; also small birds, amphibians, crustaceans (crayfish) and earthworms, some centipedes, spiders and scorpions; rarely carrion. In most areas insects preferred prey (up to 60% or more of diet), especially large orthopterans and dragonflies when available, but also beetles and many others, including very small ones and caterpillars. Mammals sometimes important, especially in winter in northern areas: mainly small rodents, particularly voles *Microtus* and cotton rats *Sigmodon*, supplemented by e.g. squirrels (Sciuridae) and ground squirrels *Spermophilus*, mice, wood rats *Neotoma* and pocket gophers *Geomys*, among others; bats also caught. Lizards common prey in tropics and in desert areas, where can be main food when other prey scarce, and small snakes also occasionally taken. Most avian prey small, often nestlings or recently fledged young, but adult birds to size of quails *Callipepla* and Mourning Dove *Zenaidura macroura* recorded. Watches intently from perch overlooking open area and, on sighting potential prey, bobs head and pumps tail before making short sally to take animal from air or ground, often first flushing aerial insect if it has landed; also, and mainly in windier weather or where suitable perches lacking, hovers or hangs in updraught at c 15–30 m while scanning ground below, then drops lower, often in stages, before making short final stoop. Sometimes hunts on foot, especially for earthworms and grounded insects, or beetles. Less frequently, though perhaps more regularly when on migration, flies low over ground in pursuit of flying prey, then recalling Merlin [294], and occasionally forages while soaring. Pounces on mammals and reptiles from flight; snatches bats from tree trunks or catches them in air, attacking from above or behind; regularly robs nests of other bird species, especially colonial hirundines. Often gathers at grass fires, where hunts along edges, dashes close to flames, sometimes vanishes in dense smoke. Prey usually grabbed in foot, and either consumed in flight or, in case of larger items, taken back to perch. Food often cached.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs, except at times on migration, when groups of up to tens, occasionally hundreds, but throughout year small to

large flocks may gather at rich food sources; solitary when breeding, too, and trios (two males feeding same female at nest) have been recorded. In noisy undulating aerial display, most frequent early in breeding cycle, male climbs with powerful beats and, near peak, gives 3–5 *klee* calls before making steep-angled dive at great speed for 10–20 m before climbing steeply again, repeating whole performance up to six times; female who loses mate may advertise with same display. Flutter-glide, slow and buoyant with rapid, shallow beats and arched wings slightly below level of body, given mainly by begging female (thus unlike Merlin [294], where more by male), although occasionally by male during aerial food-pass, when he transfers food bill to bill (she may, if hungry, snatch it with foot). Cartwheeling sometimes seen, but almost always involves territory-owner expelling intruding kestrel of same sex.

**BREEDING** March–July in North America, from May in northernmost range, January–August in West Indies and, in South America, mainly December/January–April. May in north and October–March in south; double-brooded in warmer regions, e.g. in north Chile lays in October and again in December/January. Small unlined scrape in natural cavity, mostly at c 2–25 m, in tree, cactus, post, bank or cliff, often in old hole of woodpecker (Picidae, mostly flicker *Colaptes*) or, less often, kingfisher (Alcedinidae), less frequently under house eaves or in chimney or drainpipe, and in South America sometimes in terrestrial termitarium; occasionally uses old stick nest of, especially, magpie *Pica*, and locally (e.g. Cuba) depression in top of dead royal palm; in towns and cities nestboxes widely accepted and, while this species less inclined than Old World Common Kestrel [277] to use sheltered ledge on building, one such site in Ottawa was 100+ m up on 22-storey structure. Clutch 4–6 (2–7), decreasing towards tropics, thus 2–4 in West Indies. Incubation 26–32 days. Fledging 28–31 days; dependence c 2–3 weeks, sometimes more than 1 month.

**POPULATION** By far the commonest and most widespread American falcon. Extensive range, occupancy of wide variety of habitats, and relative abundance argue for large population, this being supported by fact that migratory nominate race is present in good numbers in winter throughout Central America. In 1990s, Nearctic population estimated at 1.2 million breeding pairs. Few data from outside North America, but this is generally common breeder in West Indies and variably common to uncommon in Mexico; though considered less numerous in South America than in North, it still appears to be common enough in most of that continent, if locally uncommon or even scarce. Cade's (1982) estimate of 1 million pairs for North America (based on densities of 1 pair/100 km<sup>2</sup> in northern half of range and 1 pair/5 km<sup>2</sup> elsewhere) seems reasonable enough, or even somewhat low (since those density figures could be thought rather conservative), but his suggestion of similar numbers in rest of species' range is possibly over-optimistic. Nevertheless, this is certainly a comparatively common raptor, and a world population of 1.5 million pairs can be safely assumed, which, with the addition of immatures, would give total of at least 4 million individuals. Migration counts during 1954–75 at Hawk Ridge, Pennsylvania, indicated increase in numbers by

end of that period, and elsewhere in North America regular winter censuses suggest a decline in 1950s followed by gradual recovery from mid 1960s onwards (paralleling pattern of many other raptors during the early 'pesticide era'). Although probably fairly stable since c1980s, some decline towards end of 20th century in eastern half of USA, as in Texas, Arkansas and Georgia, but particularly in Florida, where race *paulus* (see Geographical Variation) severely reduced in earlier years as a result mainly of loss of its preferred habitat there of open pine woodland and removal of old-growth pines (with nesting holes). Suffers much competition from Common Starlings *Sturnus vulgaris* and other hole-nesting species, this offset in many parts of USA by widespread provision of nestboxes that has greatly assisted repopulation in such areas.

**GEOGRAPHICAL VARIATION** Seventeen races described which, while varying in size, intensity of coloration and extent of dark markings, all easily recognisable as of this species except for, perhaps, dark morph of Cuba and Bahamas (*sparveroides*).

*F. s. sparverius* (North America except southeast, south into northern Mexico; northern populations winter south to Panama) 'Typical' race, described under Field Characters.

*F. s. paulus* (South Carolina southward through peninsular Florida) Smaller; male fewer spots on underparts, fewer dark bars on lower back.

*F. s. peninsularis* (southern Baja California and adjacent coast of western Mexico) Smaller; paler, vertical cheek-stripes reduced, some spots below.

*F. s. tropicalis* (southern Mexico to northern Honduras) Small; more richly coloured upperparts, male little or no rufous crown-patch, breast washed salmon-pink, female always crown-patch.

*F. s. nicaraguensis* (lowland pine savannahs of Honduras and Nicaragua) Similar to *tropicalis* but even smaller; female plumage somewhat male-like.

Four races resident on Caribbean islands, all rather small and with rufous crown-patch normally reduced or absent, are listed next from north to south.

*F. s. sparveroides* (southern Bahamas, Cuba and Isle of Pines, and Jamaica) Barely larger than *paulus*, occurs in pale and dark morphs (both described under Field Characters).

*F. s. dominicensis* (Hispaniola and nearby islets) Paler than nominate, similar to pale *sparveroides* but deep rufous breast, some dark flank-spots.

*F. s. caribaeorum* (Puerto Rico, Virgin Islands and Lesser Antilles) Smaller; richly pigmented, more heavily dark-marked.

*F. s. brevipennis* (Aruba, Curaçao and Bonaire) Small, size as *caribaeorum*; rather richly coloured, male no crown-patch, more or less unbarred above, thus similar to mainland *ochraceus* (see below) but smaller and paler.

Eight Neotropical races, mostly rather pale and plain.

*F. s. isabellinus* (Venezuela to northern Brazil) Similar to *brevipennis*, but paler, male usually large rufous crown-patch, barred lower scapulars, some spotting below.

*F. s. ochraceus* (northwest Venezuela to east Colombia) Larger; male dark grey crown, few black

markings above, plain and more richly coloured below, orange-cinnamon breast.

*F. s. caucacae* (mountains of west Colombia) As *aequatorialis*.

*F. s. aequatorialis* (mountains of southern Colombia and north Ecuador) Large; darker than *ochraceus*, male obvious black flank-spots.

*F. s. peruvianus* (southwest Ecuador to extreme north Chile) Paler, buffier.

*F. s. cinnamominus* (southeast Peru and Bolivia across to Uruguay, south to Tierra del Fuego) Largest; even paler, dull rufous to buff, male barred upperparts, well-spotted wing-coverts, blotched flanks, often more black-and-white banding on outer tail.

*F. s. fernandensis* (Robinson Crusoe Island [formerly Más a Tierra], in Juan Fernández Islands) Similar, but female duller above, more deeply coloured below.

*F. s. coarctae* (Brazilian tableland) Similar again, but smaller.

Irrespective of geographical variation, partial albinos, with some white or mostly white feathers, occur infrequently; by contrast, a male with saturated plumage coloration was captured in Michigan, USA. Two reported cases of American Kestrels with plumage characters of both sexes.

**MEASUREMENTS** *F. s. sparverius* ♂ wing 173–203 mm, ♀ 178–208 mm; ♂ tail 112–142 mm, ♀ 117–142 mm; ♂ tarsus 34–37 mm, ♀ 34–38 mm. *F. s. paulus* ♂ wing 165–180 mm, ♀ 175–188 mm. *F. s. peninsularis* ♂ wing 163–178 mm, ♀ 170–181 mm. *F. s. tropicalis* ♂ wing 168–180 mm, ♀ 178–186 mm. *F. s. nicaraguensis* ♂ wing 160–179 mm, ♀ 168–177 mm. *F. s. sparveroides* ♂ wing 168–180 mm, ♀ 174–189 mm. *F. s. dominicensis* ♂ wing 180–194 mm, ♀ 180–195 mm. *F. s. caribaeorum* ♂ wing 160–177 mm, ♀ 160–178 mm. *F. s. brevipennis* ♂ wing 165–175 mm, ♀ 172–184 mm. *F. s. isabellinus* ♂ wing 170–187 mm, ♀ 177–195 mm. *F. s. ochraceus* ♂ wing 180 mm (one), ♀ 182–198 mm. *F. s. aequatorialis* ♂ wing 184–206 mm, ♀ 190–209 mm. *F. s. peruvianus* ♂ wing 181–188 mm, ♀ 185–210 mm. *F. s. cinnamominus* ♂ wing 191–198 mm, ♀ 195–207 mm. *F. s. fernandensis* ♂ wing 190–200 mm. *F. s. coarctae* ♂ wing 168–194, ♀ 193–198 mm. **Weights** *F. s. sparverius* ♂ 97–120 g (mean 109 g), ♀ 102–150 g (mean 123 g). *F. s. cinnamominus* ♂ 111 g, ♀ 118 g.

**REFERENCES** Alvarez & Montiel (1984), Balgooyen (1976, 1989), Bednartz *et al.* (1990), Belzer (1990b), Blake (1977), Bird & Bowman (1987), Bloom & Hawks (1983), Breen & Parrish (1997), Cade (1982), Clark & Wheeler (1987), Collopy (1973), Contreras *et al.* (1990), Craig & Trost (1979), Cramp & Simmons (1980), Cruz (1976), Dathe (1971), de la Peña (1992), Enderson (1960), Fjeldså & Krabbe (1990), Fuller *et al.* (1987), Gard & Bird (1990), Heintzelman (1964), Hilty & Brown (1986), Hoffman & Collopy (1988), Howell & Webb (1995), Jaksic & Jiménez (1986), Jenkins (1970), Johnsgard (1990), Johnson (1965), Koplin (1973), McLaughlin & Roughgarden (1989), Palmer (1988), Parrish *et al.* (1987), Peakall & Kiff (1988), Raffaele *et al.* (1998), Ridgely & Gwynne (1989), Roest (1957), Rudolph (1982), Sick (1993), Simonetti *et al.* (1982), Stud (1964), Smallwood (1990), Smith *et al.* (1972), Snyder & Wiley (1976), Sparrowe (1972), Stiles & Skutch (1989), Stotz & Goodrich (1989), Toland (1984, 1985b), Tostain *et al.* (1992), Varland & Loughlin (1993), Varland *et al.* (1993), Wheeler (1992), Wheeler & Clark (1995), Willoughby & Cade (1967), Wilmers (1982), Yáñez *et al.* (1980).

## 277 COMMON KESTREL

*Falco tinnunculus* Linnaeus, 1758

Plate 93

Other names: Kestrel, Eurasian Kestrel; Rock Kestrel (*ruficolus*), Alexander's Kestrel (*alexandri*), Neglected Kestrel (*neglectus*)

**DISTRIBUTION** Palearctic, Afrotropical and Indomalayan (71°N to almost 35°S, in Indomalaya south to 6.5°N; winter north in Palearctic to 65°N in west and to 43°N in east and, in Indomalaya, south to c3°N and rarely to 1.5°N); order 7; widespread and common to very common, or locally common, in most of range, less so in Afrotropics, but rare in Japan and scarce or absent in more heavily forested or more desertic areas, and generally stable though some decline in many European countries and in parts of former USSR. Breeds Europe, across central and parts of south Asia, east Atlantic islands, and Africa except most of Sahara and dense western and central forest: throughout Europe (apart from Iceland, Faroe and Shetland Islands, and Kola Peninsula) and eastward through Russia (north to lower Oh in west and to upper Kolyma in east) to Sea of Okhotsk, South Korea and Japan (central Honshu, rare), extending south to Mediterranean and its islands, Arabia, Socotra, Pakistan (south to Baluchistan), Himalayas and possibly Manipur (and Burma?), southwest India (Western Ghats, formerly also Eastern Ghats, only winter visitor in rest of peninsula) and Sri Lanka and, in east (after gap from deserts and mountains of Mongolia to Sinkiang and central Tibet), south to south and east China (Yunnan, Hainan); also Madeira, Canary

Islands and Cape Verde Islands; and south Western Sahara, northwest Mauretania and across north Africa from Morocco and north Algeria to north Egypt and down Nile valley (south to Aswan, possibly to north Sudan) and then, apart from few isolated outposts in Sahara, in sub-Saharan Africa from southwest Mauretania eastward through south Mali to north-central Sudan and north Ethiopia, southward (except in equatorial forest zone, and in much of region from northeast Somalia and southern Ethiopia to northeast Kenya) to the Cape (but apparently only winter visitor in parts of area from south Zambia and northwest Mozambique to northeast Namibia).

**MOVEMENTS** While populations of much of Europe, southwest Asia and Africa either resident or - especially juveniles and, to lesser extent, females - partially migratory, or short-distance migrants, those of north and northeast Europe and almost all of rest of Asia (except south and far southeast) migrate longer distances. In Europe, post-breeding dispersal by juveniles of largely non-migratory populations occurs in all directions, usually over short distances, but up to 400 km recorded. Main wintering grounds of long-range migrants lie in central and south Europe, Mediterranean region, Middle East (especially Israel's northern valleys), southern Asia and Africa (south to Malawi), but presence of resident populations in many of these regions makes distinction of immigrants virtually impossible (see



which can dominate diet, but earthworms and amphibians also taken, rarely fish and snails, and carrion occasionally scavenged. Most mammals in size range 4–25 g, with voles mainly of genera *Microtus* and *Clethrionomys* preferred prey where available, but mice, rats and shrews also commonly taken, and to lesser degree other vole genera (*Pitymys*, *Arvicola*, *Lemmus*) as well as squirrels, susliks *Citellus*, gerbils, young lagomorphs, moles, and even mustelids recorded; bats usually in small numbers, though quite regularly caught where common. Bird prey varied, often seed-eaters (e.g. sparrows *Passer*, finches, buntings *Emberiza*) in open habitats, but also starlings *Sturnus*, larks, pipits *Anthus*, thrushes, rarely swifts *Apus* and hirundines, and can kill species to size of partridges, pigeons, lapwings *Vanellus* and coots *Fulica*; preys on juveniles of ducks, gulls, waders (even of larger ones, e.g. godwits *Limosa*), and sometimes serious predator on chicks of terns *Sterna*. Repiles almost exclusively lizards, which frequent items in summer and can, in warmer parts of range, be principal component of vertebrate diet, but snakes less common prey. Beetles predominant insect prey in northern range, generally orthopterans in warmer south, but dragonflies and adult and larval lepidopterans common prey almost everywhere, while ant and alates termite also widely taken; proportion of invertebrates in diet varies widely depending on region and season, but probably more on availability, and insects can be taken in great quantity where abundant. When suitable food scarce or absent, will resort to vegetable items if necessary (apples recorded eaten, and excessive amounts of vegetable matter found in stomachs of some specimens). Some food cached, both in various parts of territory and by female at nest. Most hunting diurnal although, depending on circumstances, at times crepuscular and, more rarely, nocturnal. Methods include still-hunting (perhaps more frequent in non-breeding season, and in colder weather) followed by drop or long low glide on to prey, and rapid dive from soaring flight to take bird before it gains cover, but most characteristic and renowned is hovering head to wind, tail usually depressed and fanned and wings fluttering, while scanning surrounding area below: when prey spotted, drops, often stepwise, to make capture; in stronger winds hangs motionless in air, or with few intermittent beats or occasional flicks of wing-tips, at intervals gliding off to new station to continue. Will pursue small birds in flight, even at times among trees, though longer chases rare. Attracted to fires, sometimes in numbers with other raptors. Often steals food from other raptors and owls. Co-operative hunting not uncommon. Most prey caught on ground, some in air, and insects frequently hawked. Larger items normally taken to perch for consumption, though smaller ones eaten in air or on ground.

**SOCIOSEXUAL BEHAVIOUR** Solitary and gregarious; in most cases occurs singly, or in pairs or family parties, but sometimes migrates in single-figure flocks, and small groups may assemble at abundant food, while in Africa seasonal migrants from north more gregarious than local residents; typically solitary nester, though in places – and regularly so in Japan – forms loose colonies of 5–30 pairs, exceptionally 60 pairs with nests c20–50 m apart (Israel), and sometimes nests in colonies of Lesser Kestrel [275] or Western Red-footed Falcon [289];

bigamy not infrequent, rare polyandry possible. Aerial displays, often with much calling, include both single and mutual soaring and high-circling, mutual chasing, male stooping at female and she just preventing collision by rolling sideways, sometimes with talon-presentation, and male diving at perched female before swooping upward again; rolling-flight by male particularly distinctive, with fast jerky beats broken by glides, twisting one way and the other, sometimes for great distance in level flight, before terminating in glide on V-held wings; flight with rapid, shallow, winnowing beats and frequent calling often used at or on approach to nest or in defence.

**BREEDING** Late March–August in most of Eurasia and north Africa, generally earlier in south, but April–October in Cape Verdes and from late February in Japan (Honshu), and January–June in Indian subcontinent (from April in Pakistan hills, from March in Sri Lanka); in Afrotropics, lays October–December in west and across central regions to Ethiopia, April–September in East Africa and August–December (peak September–October) in south. Usually simple scrape, sometimes lined with few leaves, in wide range of sites from hole or fork in tree, or hollow or shelf in cliff, quarry, wall, building, church, ruin, bridge, pylon or similar man-made structure, at up to 50+ m (but generally below 20 m in tree), to old lagomorph burrow in ground or bank; in Africa and Pakistan cliff sites commonest, and in Japan colonies on riverside cliffs, rarely in trees; but regularly uses old nest of other bird, especially corvid or other raptor (and occasionally Wood Pigeon *Columba palumbus*, Grey Heron *Ardea cinerea* in Africa, Hamerkop *Scopus umbretta*), and readily accepts nestboxes. Clutch 3–6 (1–9). Incubation normally 27–31 (26–34) days. Fledging 27–35 days, with dependence 2–4+ weeks.

**POPULATION** In much of range, and certainly in western Europe and northwest Africa, the commonest and most familiar diurnal raptor. Most recent estimates (1990s) of European population, excluding Russia and Turkey, suggest probably at least 282,000 and possibly over 300,000 pairs, with largest numbers in centre and west (c60,000 in Germany, 51,000 in United Kingdom, 50,000 in France, 27,000 in Spain, 12,000 in Croatia, 10,000 in Czech Republic) and at least four other countries having 5,000 or more pairs; with additional 60,000+ pairs in European Russia and at least 11,000 in all Turkey, an estimated 15,000–20,000 in Israel (1980s) plus, say, further 2,000 elsewhere in Middle East and conservative estimate of 4,000 across north Africa, as well as c4,400 pairs in Canaries (1990), over 300 in Madeira and at least 1,000 in Cape Verdes (where species said to be common on most of main islands, whose land area covers c4,000 km<sup>2</sup>), a total West Palearctic figure of some 380,000 pairs can be expected. Reported densities vary greatly: the more reliable figures for Europe indicate broad average of 10–40 pairs/100 km<sup>2</sup> depending on food availability, though considerable fluctuations in areas where vole populations cyclic (e.g. in 47-km<sup>2</sup> study area in Finland, 4–89 pairs over 11-year period); but, in Israel's c28,000 km<sup>2</sup>, 90% of pairs in northern half of country, where density must exceed 1 pair/km<sup>2</sup>. Although no estimates available for rest of Asian range, which covers area at least double that of West Palearctic, species is reportedly common in most

*neglectus* ♂ wing 190–212 mm, ♀ 203–217 mm, *F. t. alexandra* ♂ wing 209–227 mm, ♀ 224–238 mm. **Weights** *F. t. immunculus* ♂ 136–252 g, ♀ 154–314 g, *F. t. interstinctus* ♂ 173–185 g (three), ♀ 150 g (one). Unsexed *rupicolus* 145–247 g.

**REFERENCES** Ali & Ripley (1978), Beaman & Mudge (1998), Bonin & Strenna (1986), Brown III *et al.* (1982), Brazil (1991), Bustamante (1994), Cavé (1968), Cramp & Simmons (1980), Davis (1975), Dejonghe (1989), Delov & Stoyanov (1994), Flint *et al.* (1984), Goodman & Meininger (1989), Forsman (1999), Gensbol (1986, 1995), Glutz von Blotzheim *et al.* (1971), Grummett *et al.* (1998), Hagemeijer & Blair (1997), Handrinos & Akrotis (1997), Handrinos & Demetropoulos (1983), Hasenclever *et al.* (1989), Hazvoet (1995), Hille &

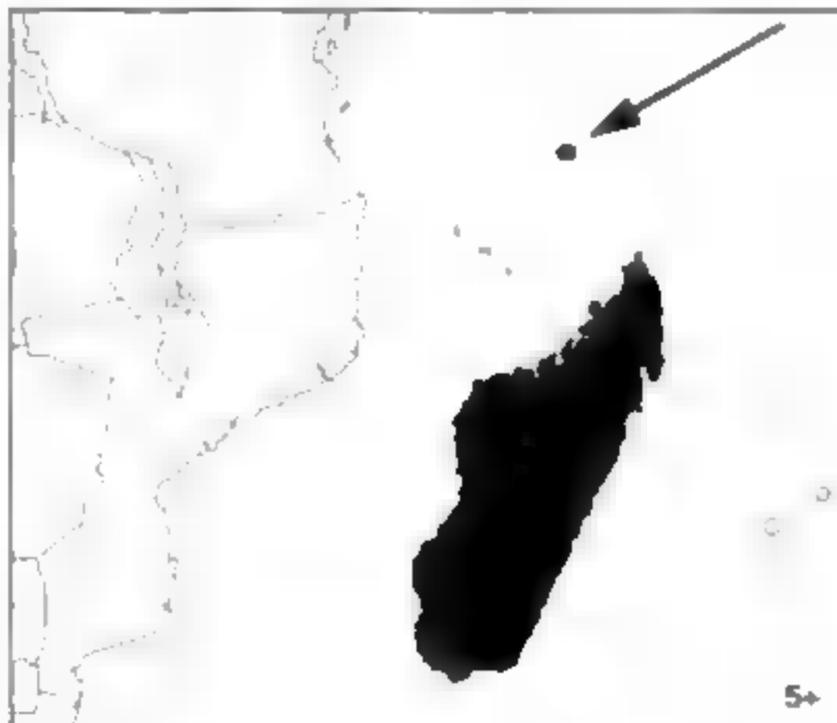
Winkler (2000), Itämielä & Korpimäki (1987), Kemp & Kemp (1998), Kjellén (1994), Korpimäki (1985, 1986), Kostrzewa & Kostrzewa (1990, 1994), Kostrzewa (1988), Kostrzewa & Kostrzewa (1991, 1997), Meijer *et al.* (1990), Newton *et al.* (1981a), Nielsen (1985), Noer & Secher (1983), O'Connor (1982), Packham (1985), Peter & Zaunreil (1982), Petersen (1956), Petitot (1983a/b), Piechocki (1982, 1991), Riddle (1979), Rijnsdorp *et al.* (1981), Roberts (1991), Rockenbach (1968), Rogacheva (1992), Schmid (1990), Shirihai (1996), Shirihai & Christie (1992), Shirihai *et al.* (1996), Strubb (1993a, b), Smythies (1986), Svensson *et al.* (1990), Tinbergen (1949), Valkama *et al.* (1995), van Zyl (1994), Village (1990, 1998), Village *et al.* (1990), Wells (1999), Wiklund & Village (1992), Yalden & Warburton (1979), Young (1975), Zimmermann *et al.* (1996).

## 278 MALAGASY SPOTTED KESTREL *Falco newtoni* (Gurney, 1863)

Plate 96

**Other names:** Newton's Kestrel, Madagascar or Madagascar Spotted Kestrel, Aldabra Kestrel

**DISTRIBUTION** Madagascar (11°S to 26°S); order 5+; common, and probably increasing. Endemic to Madagascar and Aldabra; generally distributed throughout and, though only small population on Aldabra, even that may represent saturation.



**MOVEMENTS** Sedentary and dispersive. Readily spreads to newly deforested areas and wanders rarely to Comoros, Aldabra possibly colonised only after man's arrival.

**HABITAT** More or less open country of all kinds from cultivation, grassland, steppe and marshland to young afforestation, coconut palms, eucalyptus plantations and other secondary woodland, scrub, wooded savanna, degraded forest, and forest edges and clearings; often by roadsides, and common over rice paddies. Also villages and towns, roosting or nesting in buildings; association with human habitation particularly marked on largely denuded central plateau above 1,200 m, where food, perches and nest sites concentrated. Sea-level to 2,300 m, mostly to c1,800 m.

**FIELD CHARACTERS** Small falcon, in size between

American Kestrel [276] and Common Kestrel [277] (the two most widespread of an almost cosmopolitan group), varying in plumage but always much chestnut, and with typical kestrel shape but relatively short tail and wings. Perches openly or in cover; wing-tips about two-thirds down tail. Dimorphic, with pale (generally the commoner) and dark or rufous morphs, and intermediates. Sexes distinct, and, unusually among kestrels, female averages 6% larger; juvenile often indistinguishable from female in field.

**PERCHED** **Pale-morph adult male** Rich chestnut above, plain on mantle, black-spotted on wing-coverts and scapulars, with black-streaked greyish-rufous head, obscure moustaches, and black-banded grey tail washed rufous, broader subterminal band and white tip; mainly whitish below, plain on throat, thighs and undertail-coverts, streaked on breast, and spotted on belly and flanks. **Dark-morph adult male** Similar black markings above and below, but ground colour all rich dark chestnut, with blackish crown and nape, and orange (not yellow) cere and legs. **Adult female** Rather similar, but more heavily spotted on back and barred on wing-coverts; heavier blackish markings above and below, slightly browner crown and nape, and usually browner tail; dark-morph females often slightly paler than males. **Juvenile** Usually indistinguishable in field from female, though possibly even heavier markings, still browner tail edged and tipped buff, and less clearly defined spotting below. (Probably, as in other kestrels, first moult covers contour-feathers only, so that immature male recognisable by worn juvenile quills.) **Bare parts** Eyes brown. Adult cere, orbital rings and feet yellow (dark morph orange), juvenile cere and orbital rings green-yellow at first.

**FLIGHT** Small raptor with relatively short pointed wings and medium-length tail; wingspan 2.1 times total length. Typical kestrel flight with fast, shallow, rather winnowing beats and irregular glides; hovers, often low over ground, with rapid beats and fanned tail, or hangs motionless on wind. **Pale morphs** Above, chestnut back and wing-coverts (lightly spotted on male, more heavily on female and especially juvenile) contrast with blackish primaries and chestnut-banded secondaries, greyer head (male only) and more or less greyish rump and barred tail, latter always with broad black subterminal band and white or

buff tip; below, all whitish, lightly streaked on breast and spotted on belly and wing-linings (male), or more heavily marked (female and juvenile) with thinly barred flight-feathers and tail. **Dark morphs** Similar to pale morph above, but contrasts less marked (male with blackish head); tail as pale morphs; below, whole underbody and wing-linings dark chestnut with less obvious markings.

**CONFUSION SPECIES** Barred Kestrel [287] very different (all blue-grey above, heavily streaked and barred below) and no other Madagascan falcon has predominantly chestnut upperparts. But Palearctic Lesser and Common Kestrels [275, 277] migrate regularly to East and South Africa during October–April, and could reach Madagascar. (Lesser Kestrel and three other small Palearctic falcons have been recorded in Seychelles.)

**VOICE** Commonest call similar to those of other kestrels: variously rendered as rapid chittering *ki-ki-ki-ki-ki* like Common Kestrel's [277] and loud shrill *kitty-kitty-kitty-kitty*. Sharp scream also noted.

**FOOD** Insects (especially orthopterans and beetles) stated to form three-quarters of all prey items; otherwise small mammals, reptiles, amphibians, occasional birds. Apart from insects caught during crepuscular hawking, all food taken on ground. Not infrequently forages by hovering low above ground, then slanting down gently on raised wings. More usually, however, still-hunts from low exposed perch on branch, pole, post or even anthill; when watching prey, characteristically raises and lowers tail and nods head. Also hawks insects in flight, often at dusk, when may be accompanied by migrant Eleonora's and Sooty Falcons [291, 292]

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs; sometimes small groups of up to six (family parties?). Little published on displays, but one male soared around perched female and stooped repeatedly at her, calling shrilly.

**BREEDING** (August) September–January; copulation noted July. Simple scrape in debris in cliff crevice, under roof of building, in ruin, in tree cavity or on epiphytic growth, at base of fronds in crown of coconut palm, or occasionally in old nest of Pied Crow *Corvus albus* or Black Kite [39]; no material used. Clutch 4. Incubation and fledging periods unknown, but probably c28 days each.

**POPULATION** One set of roadside counts over 2,524 km yielded average of 1 seen/21.6 km; another showed distance varying from 4.1 km in central highlands to 47.7 km in forested eastern lowlands (total 207 seen in 1,570 km, at average of 6.6 km). Cade postulated population of 30,000–60,000 pairs, of which only 100 on Aldabra. Only Madagascan raptor to have gained from deforestation, and clearly under no threat. Nest-boxes might profitably be used on Aldabra.

**GEOGRAPHICAL VARIATION** Two races.

*F. n. newtoni* (Madagascar) As described above; occurs in two morphs, proportion of dark variably 20–50% (one study averaged 37%).

*F. n. aldabranus* (Aldabra) Averages smaller and paler, and more lightly marked below, some females almost plain whitish; no dark morph known.

This and the other two Malagasy rufous kestrels, Mauritius and Seychelles [279, 280], form a superspecies.

**MEASUREMENTS** *F. n. newtoni* ♂ wing 170–201 mm, ♀ 181–220 mm; ♂ tail 110–130 mm, ♀ 115–131 mm; ♂♀ tarsus 32–40 mm. *F. n. aldabranus* ♂ wing 170–183 mm, ♀ 174–197 mm. **Weights** *F. n. newtoni* ♂ 90–117 g (four), ♀ 131–159 g (seven).

**REFERENCES** Benson (1960), Benson & Penny (1971), Cade (1982), Dee (1986), Gaymer (1967), Langrand (1990), Langrand & Meyburg (1984), Louette (1988), Milton *et al.* (1973), Rand (1936), Siegfried & Frost (1970).

## 279 MAURITIUS KESTREL

*Falco punctatus* Temminck, 1821

Plate 96

**DISTRIBUTION** Malagasy (20°S to 20°–25°S); order 3; now quite common but until recently, endangered. Endemic to Mauritius; originally widespread and 'plentiful', but by 1970s remaining handful confined to southwest corner; since mid 1980s, through manage-



ment and, particularly, reintroductions of captive-bred birds, spectacular recovery in numbers and in restocking of former breeding areas (see Population).

**MOVEMENTS** Sedentary. (Historical reports from Réunion formerly dismissed as misidentifications of other vagrant falcons, but now clear evidence from bones that same or closely related species lived on that island until 17th century.)

**HABITAT** In 1970s confined to primary forest with cliffs and gorges; unlike many typical kestrels, did not easily adapt to man's environments. But, with reintroductions of captive-bred juveniles to various areas where previously exterminated and original habitat lost, now found also in secondary forest, exotic scrub, lowland savannah, river valleys and one offshore island; some movement even into adjacent built-up areas, including Mahébourg. Sea-level to 800 m.

**FIELD CHARACTERS** Small and, unusually among kestrels, thickset falcon, rufous and whitish/buff, exten-

cultivation, urban areas. Sea-level to 2,200 m, occasionally to 2,800 m.

**FIELD CHARACTERS** Smallish falcon, very like Common Kestrel [277] of Eurasia and Africa in size, shape and character, though much darker, with larger legs and feet. Perches openly and upright on trees, bushes, rocks and many artefacts; wing-tips extend four-fifths down longish round-tipped tail, but fall short of prominent subterminal band. Sexes rather similar but distinguishable, usually of comparable size, though largest female up to 22% bigger than smallest male; juvenile very like female, separable only on good view (probably, like some other kestrels, begins partial moult within few weeks of fledging, resulting in variable mixture of adult feathering, followed by complete moult in second year).

**PERCHED Male** Mainly chestnut, slightly paler below, with thin black shaft-streaks on head, inconspicuous dusky moustaches, and cheeks variably greyish (except, usually, in Moluccas themselves; see Geographical Variation); body and wings all boldly spotted and streaked, including arrowheads on back, but throat, thighs and crissum much plainer and primaries blackish; tail grey with broad subterminal band and whitish tip (except for tail, plumage thus of 'female kestrel' type). **Female** More heavily marked, more barred on back and more streaked and 'arrowheaded' below, still with paler throat and thighs; differs particularly in grey tail having some eight bars, often broken or incomplete, in addition to subterminal band. **Juvenile** Very like female, but still darker and more heavily marked; best distinguished by coarser and more solid bars on rufous-washed tail. **Bare parts** Eyes dark brown. Cere and eye-rings yellow (juvenile greener-yellow at first?). Feet yellow.

**FLIGHT** Small raptor with typical kestrel shape and flight [see 277]: long pointed wings, longish round-tipped tail; fast shallow beats interspersed with glides on flat wings and occasional tumbling twists; hovers regularly; when soaring, wings slightly round-tipped and tail fanned; wingspan 2.2 times total length. **All plumages** Rich chestnut, more or less heavily streaked, spotted and barred with black, but for blackish outer wings and variously marked tail, always with black subterminal band and whitish tip; male's tail otherwise plain grey, female's grey with thin or broken black bars, and juvenile's rufous-grey with coarser and more solid bars. Below, chestnut body, again more or less heavily marked, and grey tail (variously marked as above), much darker than contrasting cream to whitish underwings; linings usually lightly spotted with black, flight-feathers grey-barred, primaries additionally dark-tipped and secondaries washed rufous.

**CONFUSION SPECIES** If observer is familiar with kestrels as group, confusion with any other resident raptor unlikely on reasonable view, though possibility of wanderers of related species worth bearing in mind: Australian Kestrel [282] is at least irregular migrant to southern parts of range during April–September, and Common Kestrel [277] occasionally reaches at least Borneo and Philippines during northern winter (plates 97 and 93 show differences). On poorer views, only other smallish falcons to be taken into account are two quite differently shaped hobbies, Oriental [297] and Australian [298], which both breed or wander within the range. See also Black-shouldered Kite [25], because of

habitual hovering, and some relevant accipiters (plates 40–43, 47, 48).

**VOICE** Noisy when breeding and not necessarily silent at other seasons. Commonest call shrill *kek-kek-kek...* like other kestrels and presumably used in similar variety of situations [see 277]. More screaming *rrrit-rrrit-rrrit...* in aerial display.

**FOOD** Small mammals, lizards, small birds, large insects. Hunting behaviour evidently very like Common Kestrel [277] of Eurasia and Africa: often locates prey by typical kestrel hovering, or hanging on wind, and then dives steeply to take it on ground; also still-hunts, making short flights or downward glides from tree perches; snatches some birds from bushes; and hawks insects on wing.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, but several may congregate where food abundant. Aerial displays not described, apart from calling in flight over nest site, but doubtless include circling, mock-diving, exaggerated jerky or winnowing flights with glides on raised wings, chasing through trees, and other behaviour of related kestrels.

**BREEDING** Little known. Nests occupied March/April–September/October. Lays in old stick nest, presumably of crow or another raptor, sometimes in town; often also in cavity in tree, cliff or building like closely related kestrels. Clutch 4 recorded (but presumably some variation). Incubation and fledging periods not known, but both likely to be 28+ days.

**POPULATION** No data on densities, but widespread and often common, particularly in lowlands. Total breeding range approaches 450,000 km<sup>2</sup>, which in Europe might hold 50,000–170,000 kestrels. Indonesian islands have less diversified habitats, but population in tens of thousands on the 50 or so larger islands involved seems reasonable expectation. Surely increasing through deforestation and spreading agriculture.

**GEOGRAPHICAL VARIATION** Six races described, but only four recognised here and two of those questionably distinct.

*F. m. moluccensis* (Moluccas south to Buru, Seram and Ambon) Darker chestnut and more heavily marked (includes *bernteni*).

*F. m. microbialia* (Sulawesi and adjacent islands, Masalembu Besar, Lesser Sundas at least from Lombok to Alor) Paler, notably with much whiter wing-linings and, on male, greyer cheeks (includes *renghit* and probably *javensis* and *timorensis*).

*F. m. javensis* (Java, Kangean, Bali) Like *microbialia*, but rather more heavily barred and streaked, slightly darker chestnut below.

*F. m. timorensis* (eastern Lesser Sundas from Timor and Wetar to Tanimbar) Paler, less heavily marked, with still greyer cheeks.

**MEASUREMENTS** (all races combined) ♂ wing 205–233 mm, ♀ 221–250 mm; ♂♀ tail 134–161 mm, tarsus 40–42 mm. **Weights** No data.

**REFERENCES** Andrew (1985), Bishop *et al.* (1994), Bowler & Taylor (1989), Cade (1982), Hoogerwerf (1965), MacKinnon & Phillipps (1993), Mayr (1941, 1944), Meyburg & van Balen (1994), Olsen *et al.* (1989), Smythies (1981), Stresemann (1940), Thiollay & Meyburg (1988), White & Bruce (1986).

Other name: Nankeen Kestrel

**DISTRIBUTION** Australasian (4°S to 43°S); order 6+; widespread and often common. Australia and New Guinea: breeds much of mainland Australia, together with northern and eastern Tasmania (scarce) and such offshore islands as Kangaroo, King, Furneaux Group, Fraser, Wellesley, Groote Eylandt, Wessel, Melville and Bathurst; also isolated population in Snow Mountains of central Irian Jaya, New Guinea, where apparently majority are females and numbers variable (numerous and widespread some years, seemingly absent others); breeding resident on Lord Howe and Norfolk Islands to east of Australia and, perhaps more surprisingly, on Christmas Island south of Java following probably ship-assisted colonisation in 1940s.



**MOVEMENTS** Often sedentary, but some populations partially migratory, dispersive, nomadic or occasionally almost eruptive; many immatures evidently wander. Marked seasonal fluctuations in parts of Australia, including conflicting summer and winter increases in neighbouring areas, perhaps related to drought, heavy rainfall, or changes in food supply. Southward wanderers frequently reach Tasmania, while others regularly travel northwards, appearing outside breeding range on northern section of Queensland's Cape York, on islands of Torres Strait, and in southern New Guinea during April–October (once March). These last probably do not come into contact with the endemic New Guinea race, which apparently remains in mountains. In upland areas of southeast Australia, however, where seasonal variations more marked, some suggestion of regular altitudinal movements. Though longest ringing recovery only 758 km, between Sydney and southeast Queensland, vagrants have made minimum sea-crossings of at least twice that distance: in particular, they have reached Lord Howe and Norfolk Islands, eventually becoming residents on both, and New Zealand where, after only some 15 records during 1889–1965, there was minor irruption in 1969. Vagrants recorded during migration periods of April or August–September on several Indonesian islands (including two of Moluccas) are

mostly old specimens, but more recent sight records make it likely that the species is irregular (or even regular?) migrant to Lesser Sundas and Aru Islands, west occasionally to Bali and even Java.

**HABITAT** In Australia, any open or lightly timbered country from woods and plains to cliffs and coastal dunes, but perhaps especially farmland and other cultivation with scattered trees; also such urban areas as tall city buildings and railyards. Migrants to southern New Guinea spend austral winter in grassland and savannah; some live around airfields. Isolated New Guinea race sedentary in mountain valleys at 3,200–3,800 m, but species otherwise sea-level to 2,000 m.

**FIELD CHARACTERS** Smallish falcon, similar to Common Kestrel [277] of Eurasia and Africa in size, shape and character, though much paler and relatively slightly longer- and narrower-winged and shorter-tailed. Perches upright and conspicuously on dead trees, telephone poles, posts, rocks and buildings; wing-tips reach prominent subterminal band on longish round-tipped tail. Sexes dissimilar, and, though of comparable size, largest female up to 16% bigger than smallest male and, probably with seasonal variation, 20–70% heavier; juvenile very like female, often separable in field only by direct comparison; begins partial moult within few weeks of fledging (after which males recognisable by some adult feathering on head and elsewhere), but not fully adult until complete moult early in second year.

**PERCHED Male** Crown and nape pale grey with fine black shaft-streaks, cheeks greyish-white behind obscure thin dusky moustaches, and tail plain grey but for broad black subterminal band and whitish tip; otherwise, pale rufous-chestnut above, sparsely spotted only on scapulars and greater coverts, with contrasting blackish primaries; below, all white, variably with faint creamy-rufous tinge and fine dark shaft-streaks on breast and flanks. **Female** Usually lacks grey on head and tail (though some, perhaps older, individuals have these parts grey-washed), being all rufous-chestnut above, more heavily streaked with black than male on crown and cheeks, and more spotted and arrow-marked on back and wing-coverts, while tail has about nine black bars (variable but often broken or indistinct) in addition to the broad subterminal band; usually more tinged pale rufous-buff below than male and more heavily dark-streaked. **Juvenile** Very similar to female, but tends to be more strongly streaked and spotted above, with clearer tail-bars, and more buff and broadly streaked below. **Bare parts** Eyes dark brown. Cere and eye-rings yellow (female and juvenile duller). Feet yellow.

**FLIGHT** Small raptor, lightly built even for a falcon, with typical kestrel shape and flight, see Common Kestrel [277]: long pointed wings (narrower than 277) and longish round-tipped tail; wingspan 2.3 times total length. Fast shallow beats, glides on flat wings, occasional tumbling twists; hovers regularly; soars with wings slightly round-tipped and tail fanned. **Male** Plain-looking pale rufous-chestnut back and wing-coverts, grey head, rump and tail (except for broad black subterminal band) and mainly blackish flight-feathers; all whitish-

looking below, with indistinct streaks on breast, though tail and faintly barred flight-feathers more greyish-white, dark subterminal band still obvious and primaries dusky-tipped. **Female/juvenile** Mainly rufous-chestnut above (though some adult females have grey rump and slightly grey-tinged crown and tail), with dark streaking on head, heavy spotting on back and wing-coverts, and variably distinct barring on tail (see 'Perched'); below, mainly cream and greyish-white, much like male, though body often more buff-tinged and more clearly streaked, and tail slightly rufous with variable barring.

**CONFUSION SPECIES** Because of shared habitual hovering, perhaps most likely to be confused at distance in flight with Australian Black-shouldered and Letter-winged Kites [26, 27], as well as, to north of Australia, with Black-shouldered Kite [25] (all larger-headed, shorter-tailed, and very different in plumage). Female and immature sometimes confused with brown morph of Brown Falcon [274] (larger and browner, with double cheek mark, brown thighs and longer legs, also hovers with slower beats and glides on raised wings). Australian Hobby [298] (very different in shape and plumage) only other smallish falcon over most of range, but wanderers or winter visitors to Indonesian islands would have to be distinguished from much darker Moluccan Kestrel [281].

**VOICE** Noisy, particularly in breeding season. Commonest call shrill *keek-keek-keek...* or *keekkeek...*, like other kestrels and presumably used in similar variety of situations, both perched and flying [see 277]. Also high-pitched tremulous scream (male displaying, chasing, or bringing food to nest), and thin upslurred squealing *keer keer keer* and clicking *tik tik tik* (both sexes in courtship, copulation and food-passes).

**FOOD** Small birds, mammals, insects, reptiles. Bulk made up by small birds (especially Common Starlings *Sturnus vulgaris* where feral and numerous), mammals (particularly mice when numbers high) and some reptiles (small lizards); but takes many mainly large insects (grasshoppers, crickets, beetles, moths, also ants) and other arthropods (centipedes and, unusually among raptors, numbers of spiders). Hunting behaviour very like Common Kestrel [277] of Eurasia and Africa: locates prey by typical kestrel hovering or wind-hanging within about 30 m of ground and then dives steeply; also still-hunts, making short flights or downward glides from tree perches. Takes most prey on ground; but also hawks aerial insects, and occasionally catches birds in flight.

**SOCIOSEXUAL BEHAVIOUR** Often solitary or in pairs, but sometimes several together on migration, near starling roosts or on newly ploughed land, and larger congregations during mouse or locust plagues. Aerial

displays poorly described, but evidently similar to other kestrels, see Common Kestrel [277]. Often two or three may chase among trees, the resident male screaming. Apparent territorial display of high-flying male with glides on slightly arched wings and bursts of rapid shallow beats, such bursts sometimes alternately inclined to left or right and thus flashing mainly darker or white surfaces. In aerial courtship, circling male repeatedly dives at female, who takes evasive action by rolling sideways. Courting male brings food to female with shallowly winnowing flight.

**BREEDING** September–December (July–February) in Australia, where breeds spring in south and dry season in north; one New Guinea nest with well-grown chick in early September must also have dated from July. Lays at up to c30 m in tree cavity, or hole or ledge of cliff or urban building, or old stick nest of crow or another raptor; also recorded on broken tops of tall anthills, and down to 3 m below ground inside blow-holes or mine-shafts; pieces of rotting wood or bark may be added. Clutch 3–5 (1–6). Incubation c26–29 days. Fledging 28–35 days, with dependence up to 3 weeks.

**POPULATION** Widespread and often common, with recorded densities varying from 6 birds in 1 km<sup>2</sup> to 7 pairs in under 60 km<sup>2</sup>; road-counts in northern New South Wales 0.2–0.32 birds/km. Cade put population at between 75,000 and 750,000 pairs, though in total range of over 7.5 million km<sup>2</sup> actual figure could well be higher than his upper limit. Considered one of Australia's two most numerous raptors; population here put, probably conservatively, at same level as Brown Falcon [274] in the upper hundreds of thousands. Adapts readily to habitats affected, altered or architected by man: has been aided by forest clearance and, in general terms, likely to be increasing rather than declining.

**GEOGRAPHICAL VARIATION** Two races.

*F. c. cenchroides* (whole range except New Guinea mountains) As above.

*F. c. baru* (Snow Mountains, central Irian Jaya) Slightly larger; male with darker grey head and tail.

**MEASUREMENTS** *F. c. cenchroides* ♂ wing 231–260 mm, ♀ 248–275 mm; ♂ tail 146–168 mm, ♀ 151–176 mm; ♂♀ tarsus 32–42 mm. *F. c. baru* ♂ wing 254–262 mm, ♀ 269 mm (one). **Weights** *F. c. cenchroides* ♂ 121–195 g, ♀ 115–273 g.

**REFERENCES** Baker-Gabb (1984b, 1985c), Berchler *et al.* (1986), Blakers *et al.* (1984), Bollen (1991b), Cade (1982), Cates (1985), Condon & Amadon (1954), Cupper & Cupper (1981), Dickman *et al.* (1991), Genelly (1978), Hollands (1984), Lewis (1987), Marchant & Higgins (1993), Newgrain *et al.* (1993a), Olsen & Marples (1993), Olsen & Olsen (1980a/b, 1987a/b/c), Olsen *et al.* (1979, 1993a), Paull (1991), Schodde & Tidemann (1988), Twigg & Kay (1994), White & Bruce (1986).

## 283 WHITE-EYED KESTREL

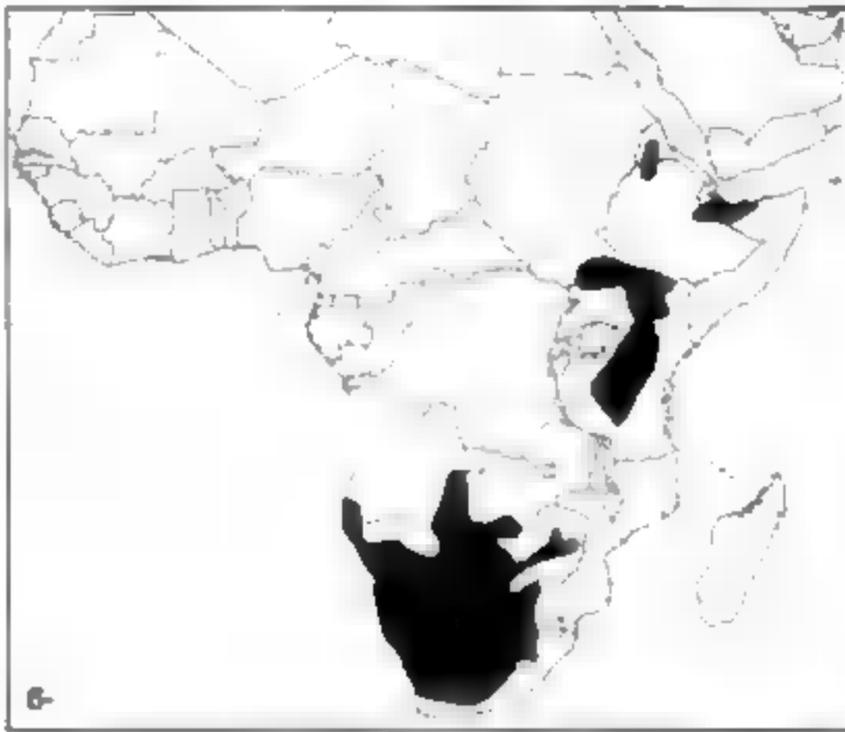
*Falco rupicoloides* A Smith, 1829

Plate 94

Other name: Greater Kestrel

**DISTRIBUTION** Afrotropical (17°N to 34°S); order 6; widespread and often common in southern Africa south

of Zambezi, but generally local or uncommon farther north. Eastern and southern Africa, with discontinuous distribution in three main areas: (a) northwest and southeast Ethiopia, and northwest Somalia; (b) south



Kenya and north Tanzania; and (c) southern and easternmost Angola and west Zambia southwards through Namibia, Botswana and western Zimbabwe to much of South Africa (but not southern and eastern coastal strip from Cape Town around to Swaziland or Mozambique).

**MOVEMENTS** Often sedentary, but immatures and other non-breeders evidently dispersive; may also be nomadic where fluctuating conditions become unsuitable. Ringing recoveries indicate some movements of over 300 km.

**HABITAT** Typically in open grassland and savannah with scattered trees, and ground cover generally no higher than 50 cm, though sometimes in taller grassland during droughts; but, more locally, also other open to fairly open country from subdesert scrub, even rocky full desert, to acacia woodland. Sea-level to 2,150 m, but mainly 800–1,800 m.

**FIELD CHARACTERS** Small to medium-sized but rather thickset black-marked tawny-rufous falcon, merely averaging slightly larger and heavier than Common Kestrel [277], also with bigger-looking head, but more remarkable for its whitish eyes than its size. Perches conspicuously on dead branches, telegraph poles or pylons, often using highest available vantage points, though at times much lower on fence posts or termite mounds; stays watching for several minutes before moving to next regular perch; wing-tips well short of tail-tip. Sexes similar, female averaging only 2% larger and 8% heavier; juvenile also rather similar, but distinguishable, as adult by beginning of second year, apart from eye colour (see 'Bare parts').

**PERCHED Adult** Mainly tawny-rufous, streaked black on slightly paler head and breast, and boldly barred on back, wing-coverts and flanks; but rump to tail pale grey with prominent dark bands, broader subterminal, and white tip; crissum whitish. **Juvenile** Rather similar, differing mainly in streaked (not barred) flanks, more blotched back, rufous (not grey) rump to tail more narrowly barred and, at closer ranges, darker crissum, brown eyes, and blue to blue-white cere and eye-rings. (Some juvenile features lost before others in transition: some body feathers moulted after three to four months, so flanks then become barred and rump grey as adult, and about

same time cere and orbital rings turn yellow, but rectrices not moulted until end of first year.) **Bare parts** Adult eyes cream; juvenile dark brown, not changing to brownish-white and then whitish until somewhere between mid second and end third year. Adult cere and orbital rings yellow; juvenile blue, becoming bluish-white and then yellow. Legs yellow at all ages.

**FLIGHT** Smallish raptor, having typical kestrel shape with long wings and longish tail, but wings longer and tips slightly less pointed than on Common Kestrel and tail relatively a little shorter; wingspan 2.3 times total length. Flight action slower, with shallow loose beats and irregular glides, but white underwings give more flickering impression; likewise soars and hovers with spread tail. **Adult** Above, prominently banded grey rump and tail stand out from black-banded rufous body and wings; below, plain white wing-linings and thinly barred flight-leathers, emphasised by bold black wing-tips and trailing edges, contrast with tawny-rufous body, boldly barred flanks and grey-banded tail; pale crissum often clear. **Juvenile** Very like adult in flight but for rufous rump and tail, streaked flanks and darker crissum; white underwings hardly less contrasting, despite some rufous-brown streaking on coverts. (See also 'Perched' for later pre-adult stages.)

**CONFUSION SPECIES** Likely to be confused only with certain other kestrels, notably female and juvenile Lesser [275] and Common [277]. Some adult female Lesser and, especially, Common Kestrels can have very grey rumps and tails (though not so prominently banded), but differ from adult Greater in smaller head, brown eyes, paler underparts with streaked flanks and in flight, apart from slight differences in shapes and wing actions, much less underwing contrast. Perched juveniles more difficult, but juvenile Lesser and Common both less rufous below and latter also often more blotched; flight pattern from underneath then most reliable distinction for Greater. Less problematic, in narrow area of overlap in Ethiopia, Kenya and Uganda, is Fox Kestrel [284] (noticeably slimmer and more elongated, all reddish and finely black-streaked but for thinly black-banded and almost pointed tail; in flight, rufous-buff wing-linings and extensive black tips; rarely hovers).

**VOICE** Largely silent outside breeding season, but voice then distinct from screaming chatters of nesting Common Kestrels [277] and roosting Lessers [275]. Usual call of alarm and threat is double *kwee-kwee* or, when highly excited, increasingly falsetto *kwan-waan-wuch-wuch-wurrr*, rapidly repeated *kek* occasionally during intraspecific interactions. In aerial displays (see Socio-sexual Behaviour), high *kek-kek*, either repeated or followed by trilling *kwerrr*, also *krr* at end of flicker-dive, and *kieriep* when 'one or both feet lowered' and during copulation. Sounds in other contexts between pair-members include soft *kro* contact calls when perched together and high chittering.

**FOOD** Mainly insects and other invertebrates, and lizards; some birds, smaller mammals (rodents, shrews), occasional snakes and odd records of toad. Very wide range of invertebrates taken, but especially solifugids, grasshoppers, termites, beetles; less frequently ants, centipedes, scorpions, spiders, earthworms. Birds mostly open-country passerines, but include plover chick,

nightjar (Caprimulgidae), some doves, and others to size of francolins *Francoelinus*. Small mammals, reptiles and birds perhaps especially when feeding incubating female and young; in one study at various nests, 74% lizards and 26% insects (mainly dung-beetles) during that period. Most commonly still-hunts from usually fairly high perch, but also regularly forages by hovering at 10–30 m, in each case dropping to ground when prey sighted. Attracted to fires, then especially taking orthopterans. Less frequently, dashes low among acacia or scrub to surprise birds and small mammals, travelling up to 300 m to do so, and even chases birds in flight or into cover. Except for birds caught on wing or snatched from trees, and some flying insects, all prey taken on ground and either eaten there or carried back to perch. Both sexes cache food, under grass tufts, other vegetation or stones, when supplies are plentiful or male brings back too much to nest (where female also caches); retrieved food shaken (to remove ants) before being eaten.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs; briefly in family parties within 2–4 weeks of leaving nest. Beginning up to four months before eggs are laid, aerial displays include gliding with wings raised high, feet dangling and tail fanned, probably by either sex whether or not mate perched (courtship and bonding); hover display, with alternate hovering and soaring in circles, male higher than female (mainly courtship); soaring or diving with one or both feet lowered (used early in courtship and against intruding White-eyed Kestrels); and flicker-diving with repeated swerving dives to flash white underwings (mostly by male in courtship, sometimes aggressively by both sexes against persistent intruders). Territory otherwise defined by prominent perching, single or mutual soaring, and high hovering (at 50+ m). Male also dives at female, who rolls and presents talons. Particularly during pre-laying period, male (and occasionally female) draws attention to nest site by alighting with wings raised vertically to show white undersides. Grey rump and tail also important as signalling device. Other wing-raising, tail-fanning, head-bowing and bill-touching displays when perched. (Based on publications by Alan Kemp.)

**BREEDING** July–April (mostly September–December) in south, any month (but peak April–July) in Tanzania and Kenya, and April–August in Somalia. Lays in old nest of another bird, often Cape Rook *Corvus capensis* or Pied Crow *C. albus*, at 2–20 m in variety of sites from

acacia stands to, in southern Africa, eucalyptus plantations and electricity pylons; rarely in tree cavity. (Recorded sites used include nests of other crows, Secretarybird [249] and Black-shouldered Kite [25], as well as edge of occupied nest of Lappet-faced Vulture [64].) Clutch 3–4 (2–7). Incubation 32–33 days. Fledging 30–34 days, with dependence 26+ days.

**POPULATION** In northeastern South Africa pairs defended territories of 5–8 km<sup>2</sup>, with local inter-nest spacing of 6 km and total estimated population of 6,000 pairs; but species not generally distributed at such high density, even in southern African stronghold, where generally 1 pair/16–29 km<sup>2</sup>, and much scarcer and more local farther north. Cade suggested population of 100,000–200,000 pairs and, with total range of about 3.5 million km<sup>2</sup>, a low six-figure estimate does indeed seem reasonable. Species not threatened anywhere. Although it may suffer locally from spreading cultivation, elsewhere it appears to have gained from woodland clearance; it also adapts well to man-made environments of pylons and roadside poles that provide new lookout and nest sites.

**GEOGRAPHICAL VARIATION** Three races.

- F. r. rupicoloides* (southern Africa)
- F. r. arthuri* (south Kenya/north Tanzania) Smaller.
- F. r. fieldi* (Ethiopia/Somalia, possibly wandering south to northeast Uganda/north Kenya) Same size as *arthuri* but much paler.

**MEASUREMENTS** *F. r. rupicoloides* ♂ wing 259–290 mm, ♀ 265–294 mm; ♂ tail 144–187 mm, tarsus 44–54 mm. *F. r. arthuri* ♂ wing 245–251 mm, ♀ 248–257 mm. *F. r. fieldi* ♂ wing 236–245 mm, ♀ 247–252 mm. **Weights** *F. r. rupicoloides* ♂ 209–285 g (14), ♀ 240–299 g (14), unsexed 181–334 g (333). *F. r. arthuri* ♂ 165–191 g (four), ♀ 193–207 g (two); unsexed 178–252 g (East Africa).

**REFERENCES** Ash & Miskell (1983), Barnard (1986), Biggs *et al.* (1979), Britton (1980), Brown (1988c), Brown *et al.* (1987), Brown *et al.* (1982), Cade (1982), Dean *et al.* (1968), Ginn *et al.* (1989), Hum (1978), Husler (1985c), Kemp (1978, 1984, 1987, 1991, 1994, 1996), Kemp & Crowe (1993), Kemp & Filmer (1989), Kemp & Kemp (1988), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957, 1962), Maclean (1993), McCann & Kemp (1994), Malherbe (1963), Osborne & Colebrook-Robjent (1982), Pickford *et al.* (1989), Pinto (1983), Pitman (1965), Steyn (1982), Tarboton & Allan (1984), Zimmerman *et al.* (1996).

## 284 FOX KESTREL

*Falco alopex* (Heuglin, 1861)

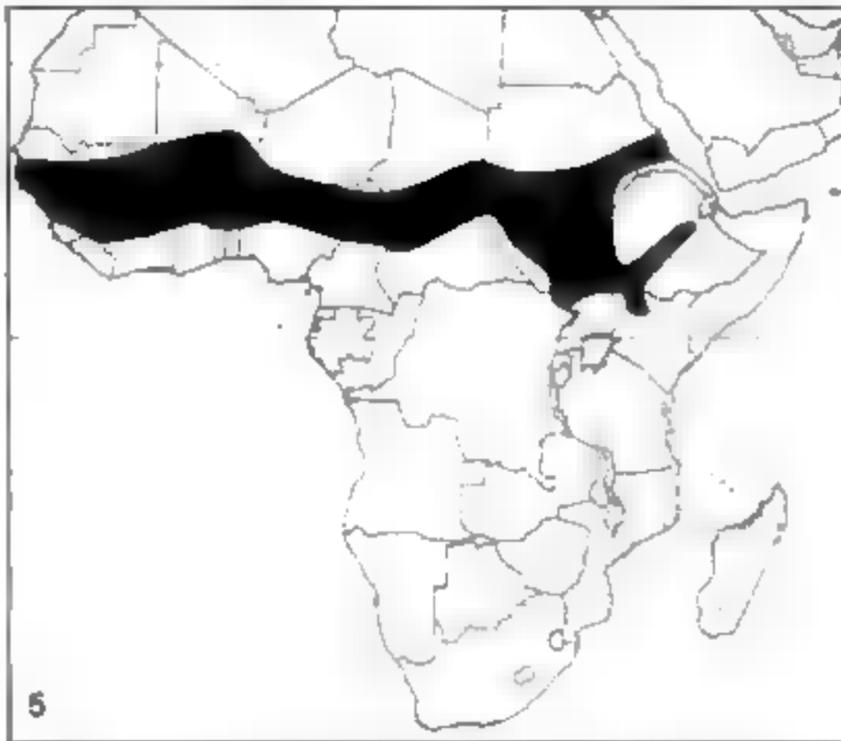
Plate 94

**DISTRIBUTION** Afrotropical (17°N to 1°N); order 5; widespread but generally uncommon to scarce, if locally numerous. West, north-central and northeast tropical Africa: southern Mali and Ivory Coast through Burkina Faso, northern areas of Ghana, Togo, Benin, Nigeria, Cameroon and Central African Republic, and southern parts of Niger, Chad and Sudan, to Eritrea, western Ethiopia, northeast Uganda, and northwest and north Kenya.

**MOVEMENTS** Usually sedentary, but vagrants west to Senegambia and Guinea, as well as south into south-

central Kenya indicate some wandering. More significantly, makes local movements in West African savannahs where more southerly range vacated in rains, soon after breeding, and reoccupied about four months later in October; this southward movement possibly connected with regular dry-season grass fires during November–February (see Food). Vagrants also reported in northeast DR Congo and north Tanzania (though latter now regarded as unsubstantiated; Zimmerman *et al.*)

**HABITAT** Mainly dry savannah and desert with cliffs,



gorges, rocky hills and inselbergs, but locally in similarly broken country at richer woodland edge. Sea-level to 2,200 m (Eritrea), but chiefly below 1,000 m.

**FIELD CHARACTERS** Medium-sized falcon, foxy-red with fine dark streaking in all plumages, looking slim and elongated with relatively long graduated tail. Perches conspicuously on rocks and trees; tips of wings well short of rather pointed tail tip. Sexes similar and female averages only 3% larger; juvenile probably distinguishable in field only by tail pattern; no data on transition to adult plumage, but tail unlikely to be moulted until early in second year.

**PERCHED Adult** All foxy-red, only slightly paler below, with contrasting black primaries; throat, belly and, usually, thighs plain, but otherwise all marked with narrow black shaft-streaks, broadest on mantle, scapulars and wing-coverts, and 15 or more incomplete and rather obscure black tail-bars; no moustachial streaks. **Juvenile** Very similar but for clearer and more complete tail-bars and often slightly clearer shaft-streaks on scapulars and wing-coverts, less clear and thinner streaking elsewhere (above and below). **Bare parts** Eyes pale brownish-yellow. Cere and orbital rings yellow, juvenile perhaps duller. Legs ochre-yellow.

**FLIGHT** Smallish raptor, with slim build, long narrow pointed wings and, for falcon, exceptionally long graduated tail giving atypical kestrel shape, more like long-tailed hobby; wingspan 2.2 times total length. Rather stiff shallow beats interspersed with short glides; tail usually closed and looking pointed, but probably spread when soaring; does not normally hover. **Adult** Above, all dark reddish but for largely black primaries and secondaries; below, rufous head, body and tail contrast with paler rufous-buff wing-linings and whiter-based flight-feathers, the latter showing some dark barring and, particularly on primaries, extensive blackish tips.

**Juvenile** Distinguishable at closer ranges by clearer black barring on tail.

**CONFUSION SPECIES** Distinctive shape and colour, and fine markings, make this bird unlikely to be overlooked as red-brown female or juvenile of any other kestrel. Common Kestrel [277], for example, has much shorter tail with subterminal band behind rounded tip, and female and juvenile are duller rufous-brown, much more spotted and barred, with boldly marked wing linings. As Fox Kestrel's pale rufous-buff wing-linings can look rather plain, see comments under White-eyed Kestrel [283] for small area of overlap in northeast tropical Africa. Some resemblance has been suggested (e.g. Brown *et al.*) to Grasshopper Buzzard [159], which, however, is larger and differently shaped and patterned, with rufous parts in quite different places.

**VOICE** Largely silent except before and during breeding season. Main call high screeching *kreee-kreee-kreee* reminiscent of other kestrels.

**FOOD** Insects, lizards and small mammals, and reportedly small birds taken, but few data. Mainly still-hunts from tree or rock, swooping down to prey on ground, but also catches insects on wing, particularly at grass fires and when alate termites swarming. Rarely, if ever, hovers.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, but locally nests in loose colonies. Only aerial displays recorded involve mutual soaring with much calling.

**BREEDING** Loosely colonial in some areas (groups of 20+ pairs in northwest Kenya). Limited data suggest eggs or young likely in nests March–June/July in West Africa, April–July in Kenya and June–November in Sudan. No nest, but lays in cliff hole or crevice, or on sheltered ledge. Clutch 2–3; Incubation and fledging periods unknown.

**POPULATION** Total regular range of species is nearly 4 million km<sup>2</sup>, but apart from references to its being common in Chad and around Mt Kadam in Uganda, as well as breeding in loose colonies of 20+ pairs in northwest Kenya, no indications of density. In any case, limited by rather precise habitat requirements and, thus, far from evenly distributed. As generally considered scarce to uncommon, it seems unlikely that the total exceeds five figures, but there are no obvious threats.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 266–293 mm, ♀ 269–308 mm; ♂♀ tail 180–212 mm, tarsus 43–45 mm. **Weights** Unsexed 250–300 g.

**REFERENCES** Bannerman (1953), Bouet (1955), Britton (1980), Brown (1970a), Brown *et al.* (1982), Cade (1982), Kemp & Kemp (1998), Lewis & Pomery (1989), Mackworth-Praed & Grant (1957, 1970), Sahar (1968), Serle *et al.* (1977), Snow (1978), Zimmerman *et al.* (1996).

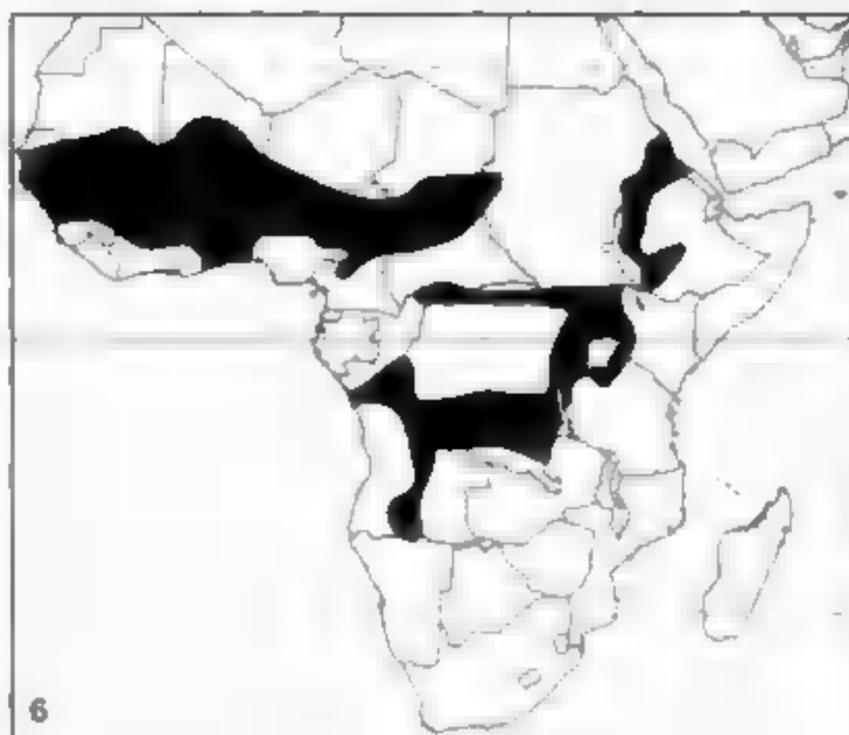
## 285 GREY KESTREL

*Falco ardosiaceus* Vieillot, 1823

Plate 95

**DISTRIBUTION** Afrotropical (18°N to 18°S); order 6; widespread and, though locally common, particularly in parts of West Africa, generally scarce to uncommon.

Sub-Saharan Africa: southwards from Senegal, southern parts of Mali, Niger, Chad and Sudan, and western Ethiopia, through all countries of West and Central



Africa, east to western Kenya and Tanzania, and south to Angola, northernmost Namibia, southern DR Congo and extreme northern Zambia.

**MOVEMENTS** Largely sedentary, but seasonal movements noted in some parts of West Africa (e.g. Gambia) but not others (e.g. Ivory Coast); wanderers also reported outside breeding range in Kenya.

**HABITAT** Palm and fairly open wetter savannah, wooded grassland, cleared forest areas with cultivation or even extensive building, plantations in degraded savannah, and wooded riverine strips; regularly forages over burnt areas and open clearings. For breeding, largely dependent on nests of Hamerkop *Scopus umbretta* (see Breeding). Sea-level to 1,800 m.

**FIELD CHARACTERS** Smallish, thickset, all-grey falcon with relatively large head and bill, and heavy feet. Perches openly on usually fairly high dead branches, telegraph poles, pylons and electricity cables; tips of shortish wings well short of fairly long tail. Sexes and juveniles similar, but females average 4–11% larger and 5–11% heavier.

**PERCHED All plumages** Slate-grey all over, slightly paler on throat, and uniform but for thin darker shaft-streaks that are usually noticeable only on head at closer ranges; some contrast provided by blackish primaries and particularly conspicuous yellow bare parts. (Juvenile tinged slightly browner, and perhaps paler on abdomen, but, once bare parts have turned yellow, virtually indistinguishable in field. **Bare parts** Eyes brown. Adult bill-base, cere and broad orbital rings yellow and contrastingly obvious, juvenile olive-green on fledging but soon turning greenish-yellow and then yellow by three to four months. Legs yellow, but juvenile greener-yellow at first.

**FLIGHT** Small raptor with large head, shortish pointed wings, longish tail with wedge-shaped tip; wingspan 2.1 times total length. Fast shallow beats, interspersed with short glides, generally low over open ground or among trees, sweeping up to perch; does not usually fly high, though occasionally soars early in breeding season; said 'never' to hover in some areas (e.g. Ivory Coast), but certainly does so in others, perhaps where habitat more open. **All plumages** All slate-grey but for whitish notches on inner webs of blacker primaries and, to lesser extent, greyer marks on lateral tail; these show, only at closer

ranges, as obscure barring from below and as spots from above (visible on tail only if spread).

**CONFUSION SPECIES** Easily distinguished from largely allopatric Dickinson's Kestrel [286] (much paler greyish-white head and rump, contrasting dark back and wings, clearly barred tail). Greater possibility of confusion with adult Sooty Falcon [292], which is migrant through East Africa, west occasionally to Uganda, during late October–early December and late February–early May and now increasingly identified in more coastal areas from Kenya south to South Africa (thus, minimal area of overlap but some risk of vagrants being overlooked or misidentified either way). Grey Kestrel and adult Sooty both grey with blacker primaries and yellow bare parts, but more hobby-like and often crepuscular Sooty somewhat larger (if smaller males not much so), with smaller-looking head and bill, longer wings that cross at or beyond end of relatively shorter and more wedge-tipped tail when perched, plain black and more contrasting primaries and darker tail-tip in flight above, and paler underwings.

**VOICE** Usually silent except when breeding. Main alarm call near nest shrill chattering *tee-tee-tee...*, much like other kestrels. Also at nest, rattling whistle like 'squeaky bicycle' (Loosemore).

**FOOD** Chiefly insects and lizards; also other arthropods (crabs, myriapods), rodents and other small mammals, some birds and amphibians, even worms. In West Africa occasionally eats nut fibre of oil-palms *Elaeis guineensis*, one of only three raptors known to do so (cf. Palmnut Vulture [32] and African Gymnogene [89]). Mainly still-hunts, from high exposed perch c15 m up, making slanting stoop to ground or low foliage, but also flies fast and low over grassland, dropping on to or chasing any potential prey disturbed. Hover-hunts in typical kestrel fashion in some parts of range, perhaps where high perches fewer, but apparently never in others. Takes almost all prey on ground, but hawks swarming alate termites and locusts in flight and possibly catches some birds on wing; also said to take bats, but it is not usually crepuscular [cf. 292/286]. Not apparently attracted to grass fires when alight [cf. 286], but regularly hunts at burnt ground.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, more often, in pairs throughout year. Soaring or mutual soaring occasionally noted, but no descriptions of any other displays.

**BREEDING** March–June north of equator south to Uganda (though earlier, January–April, in Ghana), and August–December in south Kenya, Tanzania and Angola. Normally breeds in huge domed tree-nest of Hamerkop (rarely even dispossessing pair with eggs) and makes scrape in debris at back of chamber, 60–75 cm from entrance; but also reported using other stick nests, cavities in trees (Ivory Coast), and possibly even crowns and tall stump-tops of oil-palms in West Africa. Clutch 2–5. Incubation within range 26–31 days. Fledging c30 days.

**POPULATION** Generally uncommon, despite extensive distribution over some 12 million km<sup>2</sup> in 30 countries. Cade put population at only 100,000 pairs, but miscalculated density from studies in Ivory Coast and Kenya; these actually suggest home ranges of about 10 (not 100)

km<sup>2</sup>, on which basis total might be in seven figures. But, though numbers certainly higher than 1 pair/10 km<sup>2</sup> in, for example, parts of the Gambia, they are surely much lower throughout other vast sections of the range, whether drier or more forested. Meaningful calculation impossible, but population does seem most likely to be in hundreds of thousands. Particularly in view of its ready adaptation to human land-use, this species cannot be more than very locally threatened over such a wide range: it may even have benefited from forest clearance.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 205–232 mm, ♀ 235–251 mm;

♂ tail 128–152 mm, ♀ 150–164 mm; ♂ tarsus 38–45 mm, ♀ 40–47 mm. **Weights** ♂ 205–255 g, ♀ 240–250 g (Ivory Coast); ♂ 215–250 g (five), ♀ 195–300 g (five) (southern Africa).

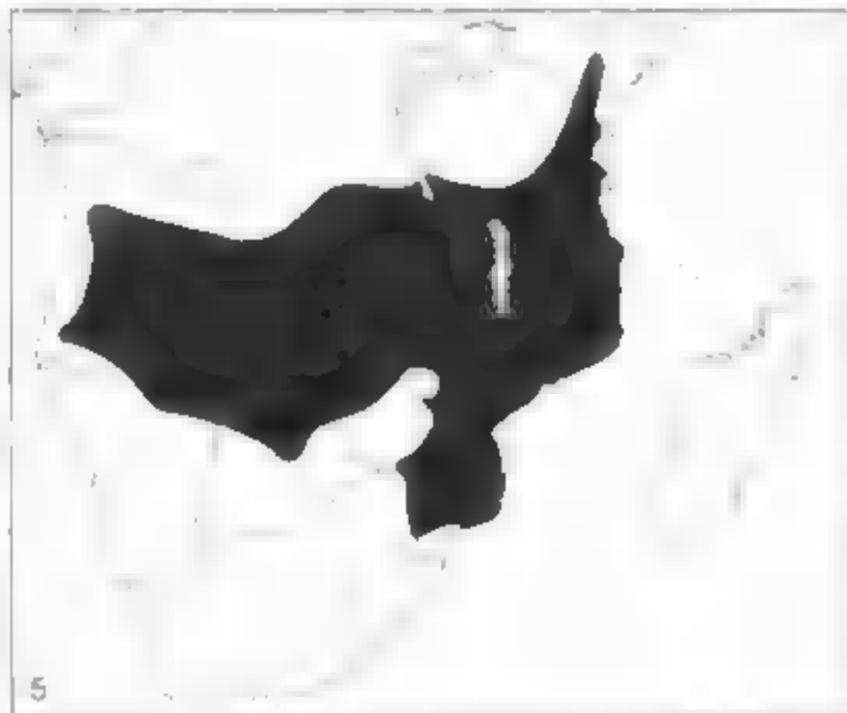
**REFERENCES** Biggs *et al.* (1979), Britton (1980), Brown *et al.* (1982), Cade (1982), Dean (1974), Ginn *et al.* (1989), Gore (1990), Jensen & Kirkely (1980), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Loosemore (1963), Mackworth-Praed & Grant (1957–75), Maclean (1993), Pickford *et al.* (1989), Pinto (1983), Serle (1939, 1943), Serle *et al.* (1977), Sinclair & Dean (1974), Steyn (1982), Thiolley (1975a/b, 1976b, 1977c), Thiolley & Clobert (1990), Wells (1965), Wilson & Wilson (1985).

## 286 DICKINSON'S KESTREL *Falco dickinsoni* PL Sclater, 1864

Plate 95

Other name: White-rumped Kestrel

**DISTRIBUTION** Afrotropical (5°S to 26°S); order 5; uncommon to scarce, locally common. South-central, eastern and just into southern Africa: Pemba and Zanzibar Islands, east and south Tanzania, southern DR Congo, and east and south Angola, through Zambia, Malawi and Mozambique, into northern parts of southern Africa (northeast Namibia, northernmost Botswana and extreme northeastern South Africa).



**MOVEMENTS** Largely sedentary, but some evidence of local movements outside breeding season in northern parts of southern Africa. Vagrant to southeast Kenya and north Tanzania.

**HABITAT** Lowland savannah and open woodland, usually but not exclusively fairly wet and in association with dum palms *Hyphaene*, palmyra palms *Borassus* or baobabs; also coconut plantations (especially Pemba and Zanzibar) and other cultivated areas; often near standing water, especially swampy floodplains. Sea-level to 1,200 m.

**FIELD CHARACTERS** Smallish, stocky falcon, mostly dark-streaked greyish and blackish, with somewhat flat-topped head, big eyes and, for kestrel, rather large bill and feet. Perches openly on dead palm stumps or high branches, often sitting still for long periods; will sometimes cling parrot-like to trunks; generally tame and

approachable; tips of wings short of medium-length tail. Sexes similar, female averaging 4% larger and perhaps 10–20% heavier; juvenile also rather similar, but just distinguishable.

**PERCHED Adult** Predominantly grey with blackish back and wings, but noticeably paler greyish-white head, rump and tail, the last evenly barred with black but for broader subterminal band that reaches tips of central feathers; shades of grey vary, some individuals looking almost white-headed and not particularly dark below, while others more strongly brown-tinged; most grey areas, except rump and undertail-coverts, also finely streaked black. **Juvenile** Similar but for fine whitish barring on lower flanks and thighs; always brownish-grey below, but hardly browner than some apparent adults. **Bare parts** Eyes brown. Adult cere and broad orbital rings yellow, juvenile pale blue-grey on fledging but turning pale yellow in three to four months. Legs yellow. **FLIGHT** Small raptor with shortish pointed wings, medium-length tail; wingspan 2.3 times total length. Fast shallow beats, interspersed with short glides, generally low over open ground; does not usually fly high, though sometimes soars early in breeding season; hovers, but not often. **Adult** Above, whitish head and distinctive whitish rump, both contrasting with blackish back and wings, and boldly barred tail; below, mainly brownish-grey, including wing-linings, but pale head and barred primaries and tail. **Juvenile** Barely distinguishable from adult (see 'Perched').

**CONFUSION SPECIES** None. Easily distinguished by greyish-white head and rump, and strongly barred tail, from far more uniformly coloured Grey Kestrel (285), which is largely allopatric but has contiguous range, and equally from migrant Sooty Falcon (292) and both red-footed (289, 290).

**VOICE** Usually silent. Main alarm call near nest, also used as contact between pair-members, is high-pitched *keee-keee-keee...*, much like other kestrels. Softer and more mewling *ki-ki-ki...* when food arriving; this call brings large young to rim of nest, whereas the other causes them to crouch. Whistling notes also described.

**FOOD** Orthopterans and other large insects and, especially in breeding season, also lizards and amphibians, as well as some small rodents, bats and birds, and

occasional small snakes; crab remains found in one nest. Chiefly still-hunts from open perch, slanting down to ground when prey sighted; sometimes dashes out after flying birds and even makes protracted chases into and among branches, but often with limited success. Occasionally hovers or hangs into wind in typical kestrel fashion, again dropping to ground. Particularly attracted to grass and other vegetation fires and, where cane being burnt in sugar plantations, waits in vicinity for flames to be lit; then becomes much more active predator, flying above or to side of fires, hawking insects or stooping fast on to any small birds and rodents driven out; at these times, insects and small birds may be eaten in flight. Seen to flush and catch roosting fruit-bat but, being crepuscular, also hawks bats at dusk. Indeed, one in Malawi specialised on bats: waiting near roost, it made low approach from perch, with fast direct attack on emerging stream of bats, sometimes using building to mask approach; if attack failed, it chased individuals, sometimes knocking one down, but no successful captures then observed. Another kestrel seen to stoop on emerging bats. Recorded following plough for any invertebrate prey turned up.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs. Mutual soaring and calling may be only aerial display.

**BREEDING** July–October in Tanzania, and September–December in Zambia, Zimbabwe and northeastern South Africa. Usually makes simple scrape in debris in hollow crown of dead palm or hole in baobab or other

tree at 7.5–18 m; sometimes, like Grey Kestrel [285], in old or dispossessed nest of Hamerkop *Scopus umbretta*, and once among girders of suspension bridge. Clutch 2–4 (1–4). Incubation probably over 30 days. Fledging probably 33–35 days.

**POPULATION** Two nests recorded only 275 m apart in Zambia, but no real data on breeding densities available. Tends to be locally common where dum or palmyra palms present, but distinctly scarce and scattered in less favoured habitats. Range covers about 3.4 million km<sup>2</sup> in ten countries and, having regard to the patchiness of the distribution, a five-figure total seems not unreasonable. Not threatened, and numbers generally considered stable. Has adapted to coconut plantations in such densely populated areas as Pemba and Zanzibar.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 209–231 mm, ♀ 218–240 mm; ♂ tail 130–144 mm, ♀ 134–150 mm; ♂♀ tarsus 35–38 mm. **Weights** ♂ 169–207 g (three), ♀ 207–235 g (two); unsexed 167–246 g (37).

**REFERENCES** Benson & Benson (1975), Biggs *et al.* (1979), Borello & Borello (1988), Britton (1980), Brooke (1972), Brooke & Howells (1971), Brown *et al.* (1982), Cade (1982), Clancey (1968), Colebrook-Robjent (1976), Colebrook-Robjent & Tanner (1978), Cook (1971), Ginn *et al.* (1989), Hammer (1978), Hammer & Blackwood (1982), Kemp & Kemp (1988), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957–73), Maclean (1993), Pakenham (1979), Pickford *et al.* (1989), Pinto (1983), Tarboton & Allan (1984), Steyn (1982), Vernon (1979a), Zimmerman *et al.* (1986).

## 287 MADAGASCAR BARRED KESTREL

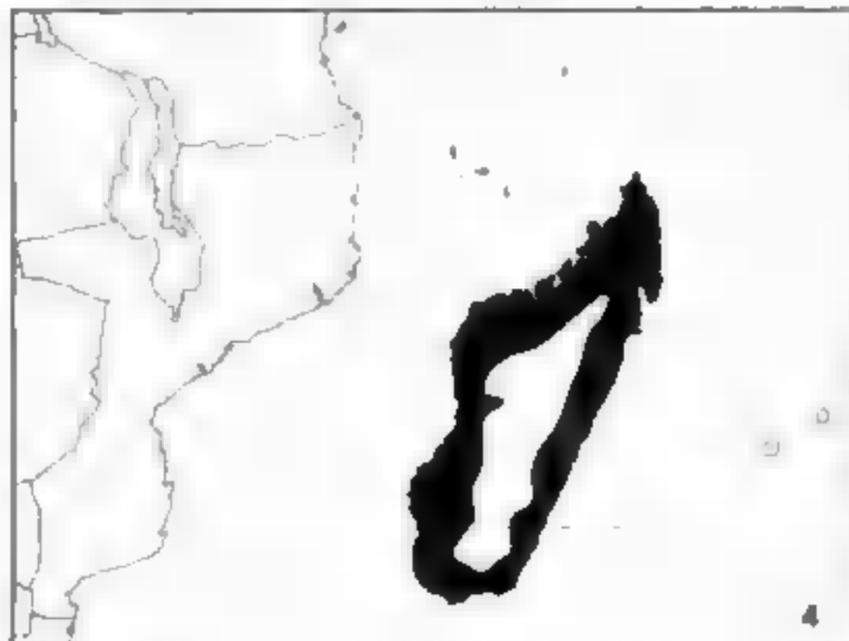
*Falco zoniventris* W Peters, 1854

Plate 95

Other names: Banded Kestrel, Madagascar Banded Kestrel

**DISTRIBUTION** Malagasy (12°S to 26°S); order 4; generally rare, but fairly common in some regions. Endemic to Madagascar: rare or absent on high deforested plateau, and local and rather rare in northwest, north and east, but generally distributed and fairly common in west and south.

**MOVEMENTS** Probably sedentary or, at most, locally dispersive.



**HABITAT** Dry and humid forest edges and clearings, and wooded savannah; also secondary scrub/brush, degraded forest on ridges above cultivated valleys, and plantations of vanilla, coffee and coconuts interspersed with strips of secondary and remnant forest growth. Sea-level to 2,000 m.

**FIELD CHARACTERS** Small falcon, one of trio of aberrant grey Afro-Malagasy kestrels [see also 285, 286], with heavy bill, relatively large head, conspicuous eye-rings, medium-short wings and longish tail. Generally very tame: takes wing as little as possible and, if disturbed at perch, usually just flies direct to another. Perches quietly in high trees for long periods, making it difficult to detect from underneath, but also perches on highest points; wing-tips about three-quarters down tail. Sexes rather similar, but female 4% larger; juvenile separable in good view.

**PERCHED Adult** Above, all grey to dark grey with fine black shaft-streaks, bluer and faintly dark-banded on lower back, rump and inner wings (looking obscurely mottled blue-grey), but for whitish forehead, thin supercilia and lateral tail-barring; and basically white below, heavily streaked on chest and otherwise boldly barred grey-brown. (Female averages darker than male above, but plumage tones of both sexes vary.) **Juvenile** Rather similar, but browner above with rufous fringes, more or less rufous bars on tail-sides, and browner

palms are the most difficult for monkeys and snakes to climb) and wet floodplains (where the falcons are able to spread also to acacias); but in northeast and south more in dune or other arid regions with large acacias in vicinity of rivers, bore-holes or even dry watercourses. Sometimes in *Borassus* in India, too, but equally in any groves or lines of trees in grassland or cultivation, sometimes by or in villages, in both drier plains and foothills, also in semi-desert scrub. These three habitat groupings relate broadly to the three races involved (see Geographical Variation). In general terms, favours clumps of trees in open country, but may hunt well away from those. Sea-level to 1,000 m.

**FIELD CHARACTERS** Smallish, slim falcon, as adult rufous-headed and grey, with rather short pointed wings, longish round-tipped tail. Often crepuscular when hunting; shy in Africa, less so in India; perches at times in open on posts, stumps, mounds, more often in tree canopy; walks easily; wing-tips well short of tail-tip. Sexes similar, but female averages 9–14% larger (different races) up to 24%, possibly also over 50% heavier; juvenile distinct: as adult after moult in latter half of first year, but may breed before that completed.

**PERCHED Adult** Whole crown, nape, and back and sides of neck rufous with fine black shaft-streaks, but narrow whitish forehead to lores; white cheek-patches enclosed by darker malar stripes and, at top and rear, by darker arcs extending back from eyes (these cheek-surrounds vary from darker red-brown or chestnut to blackish in different races; see Geographical Variation); otherwise grey to blue-grey above, which may be almost plain but for fine dusky shaft-streaks and slight barring (India) or more strongly black-barréd (Africa), with contrasting blackish primaries; grey tail similarly almost plain or finely barréd, but always broad black subterminal band and white tip; basically white below, with chest sparsely black-streaked and slightly or strongly rufous-tinged, and abdomen again finely or broadly black-barréd (often looking grey at distance). **Juvenile** Comparable pattern, but considerably duller, browner and darker: head dark buff-brown to chestnut-brown with inconspicuous fine black shaft-streaks and strong blackish cheek-surrounds; back and wing-coverts darker grey with narrow black barring and thin red-brown edges that, in fresh plumage, can give rufous cast but later become almost invisible; tail has broad subterminal band and whitish tip, much like adult, and about six other blackish bars; throat white, but rest of underparts more or less washed buff to rufous with fine brown shaft-streaks and barring in varying combinations, but often most strongly barréd on flanks and thighs; buff to rufous may extend back from upper chest to sides of nape or be interrupted, leaving two small lateral nape-patches. **Bare parts** Eyes brown to dark brown. Adult cere, orbital rings and legs yellow, juvenile duller.

**FLIGHT** Rather small, compact falcon with relatively short, broad-based and blunt-tipped wings and longish rounded tail; wingspan 2.0 times total length. Proportions often likened to those of Merlin [294], but shorter-winged and generally slightly larger: equally rapid actions, again often low over ground, but deeper beats and more direct flight, without undulations, because wings not closed in brief glides; likewise soars little, and will hover only momentarily. **Adult** Above, rufous head,

black primaries and black subterminal tail-band contrast with blue-grey body, inner wings and tail-base, which at closer ranges, especially in Africa, may all show thin black barring; barred effect more marked below (though finer barring in India can simply cause underbody and wing-linings to look greyish at distance) with only real contrast provided by conspicuous black subterminal tail-band, small black tips to primaries, more or less rufous-tinged chest, and white throat and cheek-patches highlighting darker moustaches. **Juvenile** Less contrast above between browner head, thinly black-streaked, and darker grey back and wings suffused with red-brown (as well as, in India, more strongly barréd), but broad black subterminal tail-band and primaries still stand out, and pale lateral nape-patches can be distinctive; pattern below like adult, but, apart from white throat and smaller white cheek-patches, whole body and wing-linings buff to pale rufous with browner barring to varying extent (see 'Perched' and Geographical Variation).

**CONFUSION SPECIES** Almost unmistakable in all plumages, especially when adult. See also adult Lanner and Barbary Falcons [305, 310], which share blue/grey upperparts and rufous on crown and nape to greater or lesser extent in different populations (both clearly larger, longer-winged and shorter-tailed, without broad subterminal tail-band and with plain or spotted underparts, among other differences). Compare juvenile also with longer-winged and shorter-tailed African Hobby [296].

**VOICE** Generally silent except when nesting. Calls rendered as 'peculiar shrill querulous screams' in India, and as shrill *ki-ki-ki-ki-ki*, rasping *yak, yak, yak...* and shrill rasping screaming *tinni, tinninnnnnn* in Africa, but *tinninnnnnnnn* attributed in India to fledged young chased off by presumed parent.

**FOOD** Mainly birds (98% in one breeding study); locally bats; occasionally small rodents, lizards, insects. Birds mostly passerines up to c75 g, such as larks, pipits *Anthus*, sparrows, weavers and estrildid finches, also hirundines, but clear RSD widens spectrum of available prey when feeding older nestlings and records include quails, doves, cuckoos, kingfishers, bee-eaters, and sometimes many waders up to c150 g (still bigger species taken in falconry). Insects include larger beetles, swarming locusts and alate termites. Most prey caught on wing; watches from hidden perch in tree, or fully in open on post or hummock, often near waterhole in arid areas; then launches attack-flight, usually rather low over ground but, when necessary, able to climb almost vertically towards bird overhead; or flush-forages low over long grass, scrub or trees. Tail-chase often extended. Recorded success rates 29–42%. May cache prey. Pair sometimes hunts co-operatively, and shares food. 'Do not hesitate to fly into foliage to attack their prey' (Cade), but this part also played by Gabar Goshawk [107] in well-established hunting association: several records of male Red-headed (females sitting) following or hunting simultaneously with lone Gabar.

**SOCIOSEXUAL BEHAVIOUR** Adults usually in pairs (unless male hunting while female on nest). Aerial displays limited to much mutual calling and flying from perch to perch near nest site from early in breeding season (though this presumably often prompted by human intrusion?).

**BREEDING** Mainly in late dry season, hatching when vegetation poorest and young passerines plentiful: February–May in Nigeria, March–July in Sudan, July–October in East Africa, August–November (July–December) in southern Africa, February–June in Pakistan, January–June in India. Eggs laid in old or newly completed tree-nest of corvid, or old nest of raptor, or on debris accumulated where frond joins crown, at recorded heights of 3.8–30 m in palm, or acacia or other thorny tree; adds no material. Clutch 3–4 (2–5). Incubation 32–35 days. Fledging 34–40 days.

**POPULATION** Eight nests were only 1.3–3.2 km apart in southern Zambia, at exceptional density of 1 pair/5.5 km<sup>2</sup>, and 21 pairs were 1.9–15.5 km apart in South Africa's Kalahari Gemsbok, whereas density was 1 pair/168 km<sup>2</sup> in Namib Desert. Spread over 11–12 million km<sup>2</sup> – about 7.2 million km<sup>2</sup> in Africa and about 3.5 million km<sup>2</sup> in southern Asia – population of small falcon might be expected to run well into six figures. But above densities misleading in that first two were linear associations with permanent water in arid areas, and even the Namib density cannot be applied over whole African range, where habitat requirements often very precise: generally regarded as uncommon in Africa, though possibly under-recorded, and Cade concluded 'a few thousand pairs at most' in what amounts to two-thirds of total distribution. Even in India, where more conspicuous, it is 'not very common', except on Deccan Plateau, and in Pakistan and Bangladesh uncommon. Thus, five-figure population seems more realistic. Probably not threatened, except where range inextricably linked with *Borassus* or *Hyphaene* palms and these trees felled for cultivation; conversely, has spread in Zambia where *Borassus* planted.

**GEOGRAPHICAL VARIATION** Three races.

*F. c. chicquera* (India and adjacent countries)

Smallest, with highest RSD; relatively plain grey above with only faint barring on tail (apart from subterminal band); streaked on chest, barred on abdomen; little or no dusky on moustaches or behind eyes; juvenile more strongly barred than adult both above and, especially on flanks, below.

*F. c. ruficollis* (tropical Africa south to Zambezi) Larger; strongly barred above and below, including tail; more rufous on chest; black on moustaches and behind eyes; juvenile more faintly barred than adult, especially below.

*F. c. horsbrughii* (Africa south of Zambezi) Like *ruficollis*, but averages larger still and slightly paler and less heavily barred; differences perhaps clinal, but this population much less associated with palms than in tropical Africa (see Habitat).

**MEASUREMENTS** *F. c. chicquera* ♂ wing 190–207 mm, ♀ 220–232 mm; ♂ tail 121–137 mm, ♀ 148–156 mm; ♂ tarsus 35–40 mm, ♀ 38–41 mm. *F. c. ruficollis* ♂ wing 190–218 mm, ♀ 212–236 mm; ♂ tail 116–125 mm, ♀ 136–140 mm; ♂ tarsus 35–39 mm, ♀ 38–40 mm. *F. c. horsbrughii* ♂ wing 205–227 mm, ♀ 230–240 mm; ♂ tail 134–165 mm, tarsus 38–40 mm. **Weights** *F. c. horsbrughii* ♂ 139–160 g (three), ♀ 240–305 g (three), unsexed 178–255 g (six) with ♂ probably up to 178 g and ♀ probably 190 g or more (Biggs).

**REFERENCES** Ali & Ripley (1978), Bednarek (1993), Brewster (1991), Brown (1988c), Brown (1970a), Brown *et al.* (1982), Cade (1982), Colebrook-Robjent & Osborne (1974), Finch-Davis & Kemp (1980), Fry (1964), Ginn *et al.* (1989), Gore (1980), Grummet *et al.* (1988), Gullis & Osborne (1988), Herholdt (1994), Iuskipp & Iuskipp (1991), Kemp & Kemp (1988), Lewis & Pomeroy (1989), Maclean (1958, 1993), Malan (1991), Malherbe (1963), Olwagen (1984), Olwagen & Olwagen (1984), Osborne (1981, 1984), Pakenham (1979), Paxton & Brown (1987), Pickford *et al.* (1989), Steyn (1982), Roberts (1991), Robinson & Stuart (1975), Worden (1983), Zimmerman *et al.* (1996).

## 289 WESTERN RED-FOOTED FALCON

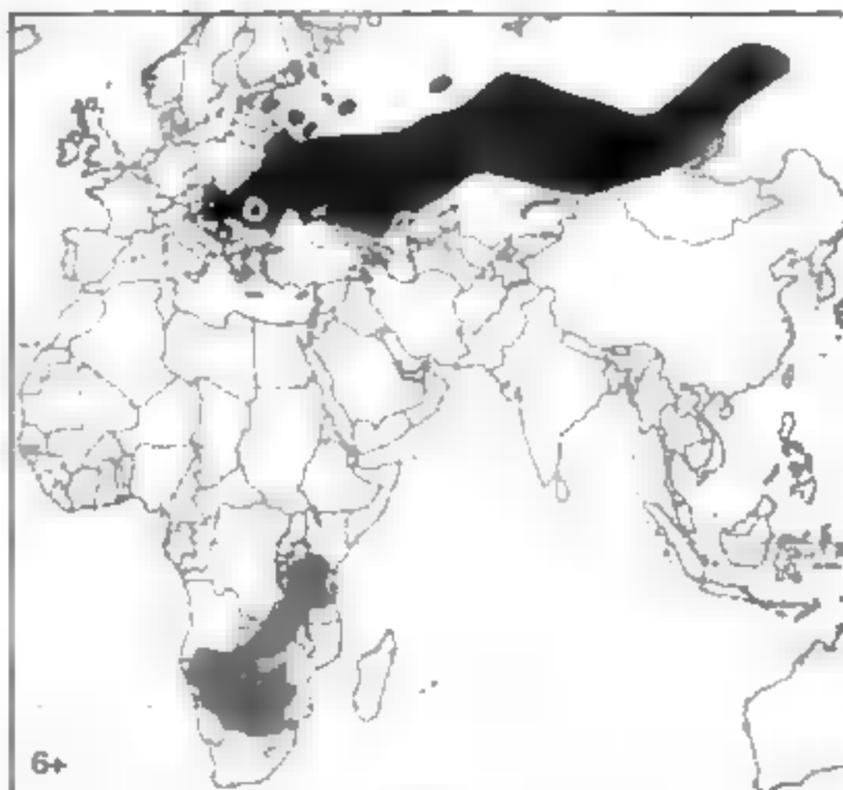
*Falco vespertinus* Linnaeus, 1766

Plate 99

Other name: Red-footed Falcon

**DISTRIBUTION** Palearctic, but in winter entirely Afrotropical (64°N to 42°N, winter 15°S to 29°S); order 6+; fairly common to locally common, especially in eastern range, and more or less stable, but evidence of some decline in west. Breeds east Europe, and west, central and north-central Asia: though occasional breeding records from many European countries (west to Atlantic coast of France, north to Sweden and central Finland), main range now from Belarus south to Hungary, northern Serbia, Romania, Moldova and east Bulgaria, eastward through Ukraine and northwest and south Russia (north to taiga and middle reaches of Yenisey, south to Volga delta) and north Kazakhstan to extreme northwest China (northwest Sinkiang) and then northeastward, skirting northern Altai, to upper Lena river.

**MOVEMENTS** Entirely migratory, moving up to 11,000 km between nesting areas and winter quarters, covering



most of journey at very high altitudes. Gathers in large flocks on and near breeding grounds before departing, from mid August but chiefly in September, most of eastern populations first flying on broad front west and southwest to western side of Black Sea to join European breeders, all or most then moving south on broad front, often in mixed flocks with Lesser Kestrels [275] and other small falcons and covering long stretches at high altitudes (passage thus largely invisible from ground), with majority apparently crossing into Africa at eastern end of Mediterranean Sea during late September–October (e.g. day count of 5,000–10,000 through Israel on 4 October 1986), then continuing south, still high up (e.g. only two autumn records for Kenya), to winter grounds in sub-Saharan Africa from southern Angola and southwest Zambia southward through Namibia (except southwest and south), Botswana and Zimbabwe to northern South Africa (down to region of former southwest Natal); remains in southern Africa mainly November–late February, following rain-fronts to ensure ready supply of emerging termites. Northward return again on broad front, but with more westerly route that takes many birds across western and central parts of Mediterranean Sea, though still good numbers in northwest Turkey, arriving at breeding sites from late April–May (June in northeast). A number of recent records in West Africa (e.g. Senegal coast) during September–March indicate possible minor passage much farther west at both seasons. Vagrants recorded widely away from breeding areas, including most European countries, both in autumn and, particularly, in spring; in latter season, when migration coincides with large anticyclonic systems in east Europe, many appear not only in southwest Europe but also, individually and in small to larger flocks, well to north in Britain and Scandinavia (record year 1992, when, in course of few days in May, 5,000 individuals crossed Strait of Messina from Sicily to Italy, up to 2,000 reached Netherlands, 760 Denmark, and 100+ each in Britain and Sweden); large invasions rarer in autumn, but do occur, e.g. 82 (mostly juveniles) in Finland mid August to mid/late September 1996.

**HABITAT** Breeds in open lowlands with trees and plenty of insects, including steppe and forest-steppe, cultivation and pastureland with tall hedgerows or fringing trees, riparian forest bordered by open country, agricultural areas with shelterbelts, open woodland and clearings and, in northeast, boggy areas and taiga edge; also forages over wetlands, riversides and open fields. In winter, savannah and other grassland, and low scrub, roosting in small stands of trees (including eucalyptus). Sea-level to c300 in west, but to 1,500 in in Asia.

**FIELD CHARACTERS** Smallish, slim falcon about size of Northern Hobby [295], adult male mostly grey with dark rufous trousers but female all rufous-orange below and on crown, with long wings and tail and small bill. Often crepuscular, spending long periods of day perched inconspicuously in bush or tree, but also openly on wire, post or branch, and even on ground, where hops and runs with tail cocked, and at times very tame; wing-tips reach or exceed tail-tip. Sexes very different, and female averages barely larger and hardly any heavier; juvenile and most immatures distinct; moults into adult plumage during second winter, but some breed when only one year old.

**PERCHED Adult male** Dark slate-grey to blue-grey above, somewhat blacker tone on head (especially around eyes) highlighting orange-red orbital rings and cere; paler silvery-grey remiges sometimes noticeable; and all slaty to blue-grey below but for dark rufous-chestnut lower belly, trousers and crissum, and conspicuously red legs. **Adult female** Very different: above, blackish-banded brownish-grey, tail paler with blackish bars, broad black subterminal band and narrow rusty-white to creamy tip; head rusty, either plain or finely streaked dark brown on crown, with creamy forehead, cheeks, neck-sides and chin, and blackish patches around eyes extending into short dark chestnut moustaches; below, all pale rufous to orange-rufous with variable fine dark streaking (sometimes absent). **Juvenile** Above, brownish-grey with light rufous fringes, looking scaly-patterned; heavily dark-streaked brown crown against buff forehead and thin supercilia, and large dark brown horseshoe-shape formed by eye-mask and wide moustaches, contrast creamy throat and neck-sides, latter almost joining across lower nape; tail brownish (female?) to rufous-washed grey with about eight narrow dark bars, slightly broader subterminal band and thin creamy to light rufous tip; below, all light buff with sharp, narrow dark brown streaks on breast and (more broadly) flanks. **Second-year male** Highly variable, but by first spring (following partial post-juvenile moult in Africa) normally clearly identifiable: resembles adult male above except for worn grey-brown remiges and some wing-coverts and barred outer tail (all retained from juvenile), while head pattern usually juvenile-like but forehead/crown to nape dark slate and often cheeks rufous-washed and hint or more of rufous hind-collar, and, below, variable mix of slaty and light rufous feathering (either colour may dominate, but especially rufous) though normally rufous thighs and vent; by late summer/autumn adult-like but for few rufous patches on neck and belly, some worn juvenile remiges and perhaps outer rectrices, and often shadow effect of darker crown and moustaches. **Second-year female** Often hard to distinguish from adult, except for worn juvenile remiges and outer rectrices, usually plain greyish outer greater coverts contrasting with barred browner upperparts, and paler hindneck or, sometimes, very pale (almost white) and thinly dark-streaked crown (some have streaky brown crown, more like juvenile), and less 'sharp' head pattern, while often paler below with stronger streaking; much as adult by second autumn. **Bare parts** Eyes dark brown. Adult cere, orbital rings and legs orange-red to red, female more orange; juvenile orange-yellow or yellow, changing to adult through second year.

**FLIGHT** Small raptor with long, narrow but rather broad-based, quite pointed wings, longish rounded or more squarish-ended tail and slim body, not unlike short-tailed kestrel [see 277] in shape; wingspan 2.4 times total length. Flight agile, rather flat, loose beats interspersed with short scythe-winged glides, beats faster and stiffer if chasing prey; soars on slightly depressed wings, tail usually spread, and makes foraging patrols on curved course or dashing flights after prey; regularly lowers, especially in breeding areas (vagrants less inclined to do so), beats deeper than kestrels. **Adult male** Looks very dark but for paler silvery-grey flight-feathers above, particularly primaries (and extending on to greater and primary coverts), contrast being very obvious in certain

lights; below, although wing-linings, tail and head darker than remiges and underbody, and thighs and crissum dark rufous, generally appears rather uniformly dark, with contrasts visible only at closer ranges. **Adult female** Above, apart from plain-looking rufous crown and unmarked dark brown-grey to slaty remiges, all blackish-banded brownish-slate with paler tail, latter fully dark-banded and with black subterminal and thin whitish tip; below, light rufous to orangey body and wing-linings (latter often shade paler than body), occasionally lightly streaked (most visible on flanks and greater coverts), contrast black-banded whitish quills, wings with blacker tips and trailing edges and tail with broader black subterminal band; white throat and face with dark mask and small moustaches obvious in closer view. **Juvenile** Streaky brown cap isolated by buffy forehead and collar; upperparts and wing-coverts brownish-grey with paler edges, appearing wavy or irregularly banded, with clearly contrasting darker plain remiges and primary coverts; rusty-washed grey tail thinly dark-banded and pale-tipped, with broader dark subterminal; below, apart from plain creamy-buff crissum and creamy throat and neck-sides, with dark mask and moustaches generally striking in good view, light buff body and wing-linings rather heavily dark-streaked (linings sometimes look slightly darker, greater coverts more banded) and offset light grey and conspicuously dark-banded quills, wings with broad black tips and trailing edges and tail-end as above. **First-summer male** Juvenile remiges, outer rectrices and some wing-coverts retained into first spring/summer, so upperwing grey-brown, lacking adult's silvery tone to quills, with coverts and back somewhat patchy slate and brown, and outer tail banded, while head often like juvenile but for dark slaty crown; and, below, very variable mix of rufous and slate-grey on body, and generally rufous lower belly to tail-coverts, but tail-sides and underwing juvenile-like but for some new grey adult wing-coverts. **Second-autumn male** With further moult starting in first summer, now much more like adult, but usually still some small rufous patches on neck and belly and, notably, variegated wing pattern of newly moulted dark grey inner primaries and inner secondaries and strongly contrasting paler (worn juvenile) outer primaries and secondaries. **Second-year female** Generally indistinguishable from adult, except in favourable views (see 'Perched'); with first-spring birds, look for distinctly brownish appearance to upperparts contrasting with greyer greater coverts and blacker-brown flight-feathers, and at least some barring on tail.

**CONFUSION SPECIES** Adult male's dark slaty plumage with silvery primaries and rufous trousers and crissum make it normally unmistakable, but in poor view possibly confusable, mainly in Mediterranean region and Africa, with Sooty Falcon [292] or dark-morph Eleonora's [291]; former about same size and similar shape (but closer to Northern Hobby [295]), Eleonora's bigger with different shape and flight (longer wings, longer more tapered tail, often slow beats), while both have all-dark primaries, yellow bare parts (cere and orbital rings blue on female Eleonora's), no rufous in plumage; in African winter quarters, however, easily confused with Eastern Red-footed [290] (which see), less so with Grey Kestrel [285] (more thickset, shorter wings well short of tail-end, paler plumage, blacker primaries, no rufous, bare

parts yellow). Though adult female Western Red-footed distinctive enough, juvenile more easily mistaken for juvenile Northern Hobby [295], but that species shorter-tailed, rarely (if ever) hovers, lacks buff forehead, has broad dark band joining hindcrown and mantle, more uniform darker upperparts (only faintly pale-fringed), unbarred uppertail and, below, much bolder, denser and blacker markings on whiter ground (creating overall darker appearance) and less clear tail-bars; or, especially because of hovering habit, with female or juvenile Common Kestrel [277] (clearly longer-tailed, more contrasty above, paler below, wider subterminal tail-band). See also juvenile Sooty Falcon.

**VOICE** Often noisy, particularly when moving in flocks or at pre-roost gatherings. Common call a high-pitched rhythmic *kew kew kew* by male or slower rising *kwee kwee kwee* by female, very like flight call of Northern Hobby [295] but somewhat weaker; other, faster calls in alarm.

**FOOD** Adult diet almost solely insects, with some other invertebrates and few vertebrates, but chicks fed mainly on latter. Wide variety of insect prey includes, in particular, crickets, grasshoppers and locusts, also beetles, dragonflies, mayflies, various dipteran flies, cicadas, both adult and larval lepidopterans, and hymenopterans. Among other invertebrates, especially spiders but also snails. Few vertebrate prey eaten by adults include small mammals (especially mice and common vole *Microtus arvalis*), though these probably important early in season before emergence of favoured insects; also occasional small birds, frogs and lizards. Although nestlings fed some insects (mainly orthopterans), diet includes high proportions of amphibians, small fledgling birds, and lizards, while small rodents and shrews important locally; in Hungary, prey delivered to newborn chicks was mostly spadefoot frogs *Pelobates fuscus*, small fledglings, sand lizards *Lacerta agilis* and orthopterans. In African non-breeding quarters, takes large numbers of termite and ant alates, as well as locusts and grasshoppers. Often hunts in early morning and at dusk, but also during day. Commonly still-hunts, making short drop from low perch, sometimes followed by brief pursuit, or drops on to prey from hover; but also frequently hawks insects in fairly low flight, thrusting legs forward to snatch prey and then transferring it to bill or, if too large, flying to perch to consume it; occasionally catches small birds in flight, these always taken to perch or ground. Runs/hops after prey on ground, moving nimbly. Occasionally steals food from other small raptors.

**SOCIOSEXUAL BEHAVIOUR** Social and gregarious, at all times of year occurring in small to larger groups of up to 20+, and on migration even in three-figure flocks, though also met with singly; winter roosts can exceed 1,000 individuals; normally nests in loose colonies of two or three to up to 200+ pairs, but sometimes solitarily, especially at edge of range or where food locally scarce. Aerial display involves soaring for lengthy periods in flocks, eventually descending to just above ground and continuing on undulating course, with sharp twists and turns, and mutual high-speed pursuits, all with much calling; male may occasionally perform display-flights like those of Common Kestrel [277], including steep dive towards perched female followed by upward swoop.

**BREEDING** Social, sometimes solitary. Mid April–July–August. In old nest of another bird, most commonly Rook *Corvus frugilegus* (at times even empty nests in active rookeries), selecting higher nests generally at 15–20 m, but also, and then often solitary, that of other crow or raptor; sometimes in tree hole or, occasionally (e.g. in Russia), in cliff cavity or even on ground under shrub; usually no material added. Clutch 3–4 (1–6). Incubation uncertain, likely c27–28 days (22–23 days often cited, but probably too low). Fledging 27–30 days, with dependence 1–2 weeks.

**POPULATION** Few meaningful data on densities within large range, which covers some 8 million km<sup>2</sup>. Latest estimates (mid 1990s) in Europe indicate low numbers at western extremes of range, with fewer than 100 pairs in each of east Bulgaria, Belarus and north Serbia, but include 2,200 pairs in Hungary, 200–600 pairs Romania, 120–200 pairs Moldova, 400–600 pairs Ukraine and 15,000–40,000 pairs in southern Russia, with total for West Palearctic of around 25,000 pairs; but 1992 survey in south Ukraine (Sivash region) gave 250–500 pairs in 4,000 km<sup>2</sup>, so population for entire Ukraine (some 450,000 km<sup>2</sup>), where species a fairly common breeder throughout, could be more like 25,000+ pairs. This falcon remains common in Asia, and, although difficult to evaluate numbers there owing to necessarily localised nature of breeding colonies, the broad band of terrain occupied across that continent, where much suitable habitat still available, could be expected to hold a very minimum of 100,000 breeding pairs, giving world

population of at least 150,000 pairs and probably much higher (up to c400,000?). Numbers in Europe, at least, have declined since the 1960s as result of destruction of suitable nesting sites and, probably more significantly, widespread use of pesticides affecting food supply, so range has consequently retreated eastward; several colonies have been reduced in size and, since productivity is generally greater in larger colonies than in small ones or at solitary nests, further decreases in total numbers would not be surprising.

**GEOGRAPHICAL VARIATION** Monotypic. Forms a superspecies with Eastern Red-footed Falcon [290], the two sometimes treated as conspecific, but major differences in plumage, especially of female and juvenile, make them better treated as allospecies.

**MEASUREMENTS** ♂ wing 224–255 mm, ♀ 232–264 mm; ♂ tail 119–135 mm, ♀ 122–142 mm; ♂ tarsus 28–32 mm, ♀ 28–33 mm. **Weights** ♂ 115–190 g, ♀ 130–197 g.

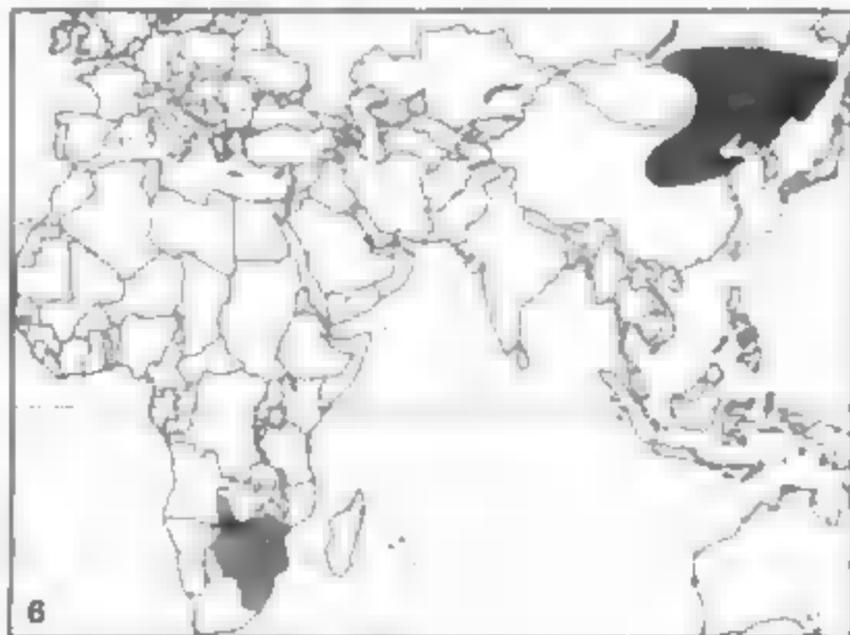
**REFERENCES** Merstam (1980), Brown *et al.* (1982), Cade (1982), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Etchécopar & Hùe (1978), Flint *et al.* (1984), Fousman (1995a, 1990), Fulop & Selivka (1988), Genschel (1986, 1995), Ginn *et al.* (1989), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Hagemeijer & Blair (1997), Handrinos & Akrotis (1997), Haravziths & Bagyura (1993), Hollom *et al.* (1988), Horvath (1955, 1956, 1963, 1975), Kemp & Croce (1993), Kemp & Kemp (1998), Keve & Szij (1957), Marlean (1938), Moreau (1972), Pickford *et al.* (1989), Porter *et al.* (1981, 1996), Rogacheva (1992), Shirihai (1996), Shirihai *et al.* (1996), Small (1995), Zimmerman *et al.* (1996).

## 290 EASTERN RED-FOOTED FALCON *Falco amurensis* Radde, 1863

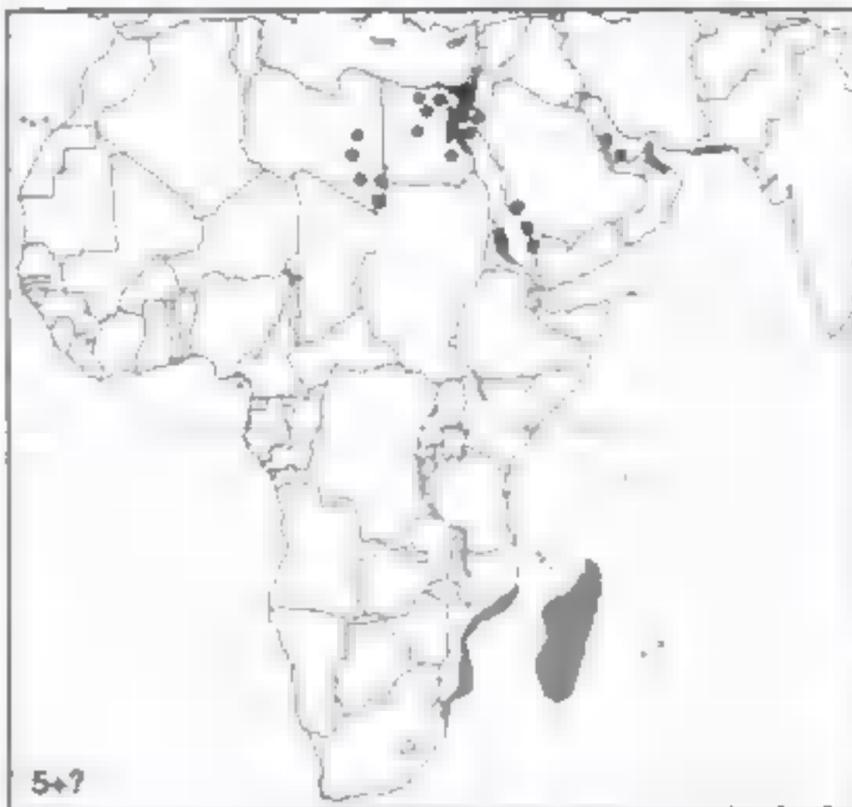
Plate 99

Other names: Amur Falcon, Manchurian Falcon, Manchurian Red-footed Falcon

**DISTRIBUTION** Palearctic, but in winter entirely Afro-tropical (52°N to 32°S, winter 10°S to 33°S); order 6; fairly common to common, but everywhere local. Breeds east Asia: eastern Siberia from Transbaikalia eastward through Amurland to Ussuriland, southward through northeast Mongolia and Manchuria to North Korea and eastern China (south to southern Shaanxi and Anhui). Has also bred far to southwest, in northeast India (Cachar, in Assam).



**MOVEMENTS** Long-distance migrant, entire population migrating 11,000 km southwest to winter in sub-Saharan Africa, accompanied for parts of both outward and return trips by large flocks of Lesser Kestrels [275] and other small falcons or Eurasian Rollers *Coccyus garrulus*. Leaves breeding areas from late August/September, some not until some weeks later (e.g. total of 982 passed over Beidaihe, c260 km east of Beijing in northeast China, during end August to end October 1987), generally in large to huge flocks that may number from hundreds to several thousands of individuals, flying on broad front across Asia: majority apparently pass during October–November south of Himalayas, through region extending from about Nepal eastward across Burma (but recorded also east and south to northern Thailand, Indochina and Hong Kong), and at high altitude (as indicated by fact that large numbers in southern Arunachal Pradesh in late October 1992 were first reports for that part of northeast India), onward through peninsular India (most records from southwest) and then evidently right across Indian Ocean to reach East Africa, though sea-crossing poorly documented and some may fly no farther than Maldivé Islands, where few said to 'winter' in south, while winter records also from Nepal, northeast and southwest India, and Sri Lanka; once in Africa, birds continue south through Kenya to wintering grounds mostly in area from



others down Red Sea, while regular passage also along River Nile and Rift Valley (small numbers annually in central, east and southeast Kenya to early December), arriving mostly end October–November in winter quarters, mainly in Madagascar but also on African mainland (primarily coastal Mozambique and eastern South Africa south to southern Natal, with occasional records west to central Namibia), and on western Indian Ocean archipelagos. Northward return seems to start in March–April, or even late February (cf. Eleonora's Falcon [291]), though some linger into May, and passes in reverse along same routes as in autumn even if less frequently seen (e.g. only 'sporadically' in Kenya, and rare spring migrant in northwest Somalia), with main arrival on northern breeding grounds during April–May. Vagrants in Turkey, Cyprus, Syria, Lebanon and Iran perhaps less unexpected than the several records as far west as Malta (June–November), and certainly more predictable than the one reported in flight in northeast Spain in October 1997.

**HABITAT** Breeds in hot, arid habitats, generally unvegetated or virtually so, from rugged desert mountains with some cliffs and canyons to small rocky coral islands, foraging also over nearby or more distant agricultural or vegetated land or oases; in non-breeding season, however, when overlaps widely with Eleonora's Falcon [291], found in far less extreme habitats, including grassland, open terrain with trees, woodland and rainforest edge, towns and villages, even wet areas such as lakes and rivers, open marshland and paddyfields, though extent of competition with Eleonora's not fully studied. Sea-level to c.350 m, flying to c.1,000 m; in winter to 2,000 m in Madagascar.

**FIELD CHARACTERS** Smallish to mid-sized falcon, all dark as adult, similar in shape to Eleonora's [291] but with comparatively shorter, slimmer, more wedge-tipped tail. Most active at dawn and dusk, for much of day often perching openly on rock or low shrub, or more concealed in shade of rock or any available vegetation; folded wings, tips clearly crossed, equal or just exceed tail-tip. Contrary to earlier assertions, monomorphic (dark plumage age-related). Sexes distinguishable in good view, female only some 5% larger; juvenile distinct; as adult after two to three years, but may breed at one year.

**PERCHED Adult male** All blue-grey to sooty lead-grey, and generally rather uniform in appearance (dark leather-centres to upperparts not obvious) but for noticeably darker, blackish primaries and tail-end, and blackish lores usually extended into faint moustaches, while underbody often looks darker than upperparts, and chin and upper throat sometimes paler; yellow bare parts striking. (Some variation, older birds tending to be darker, almost black, and lacking contrasts.) **Adult female** Differs only in being slightly darker, more sooty, so contrast between body and blackish primaries less marked (still discernible), and usually lacks moustaches though more likely to show paler throat; bare parts less bright. **Juvenile** Above, brownish-grey with narrow, indistinct whitish to buff edges, and contrastingly darker remiges (mainly primaries); dusky brownish-black hood extending well below eye and into broad moustaches, contrasting pale creamy-buff to yellow-brown lower cheeks and throat; and, below, dirty pale buff to yellow-brown, rather diffusely but variably streaked brownish-grey, streaks often denser on breast, which also washed or blotched pale slate, crissum sometimes unstreaked; undertail (except central leather pair) thinly barred buffish and dark brown, with broader dark subterminal and whitish tip. **First-summer** Similar to adult but darker, more brownish-tinged sooty-grey, and retains juvenile tail and remiges (see 'Flight'). **Bare parts** Eyes dark brown. Adult male cere and orbital rings orange-yellow, female lemon-yellow; juvenile both sexes pale bluish. Adult legs orange-yellow to yellow; juvenile paler yellow to yellow-green.

**FLIGHT** Small, slim raptor, almost a smaller version of Eleonora's [291] but with proportionately even narrower wings, slightly shorter and narrower tail with more wedge-shaped tip formed by more protruding central rectrices (shape most obvious from below); wingspan about 2.3 times total length. Rather slow, somewhat still beats interspersed with glides, much as Northern Hobby [295], but in pursuit beats faster, stronger and noticeably deeper, more like Peregrine Falcon [309]; wings flat in glide, slightly depressed and angled at wrist in soar. **Adult male** Appears predominantly dark blue-grey to sooty-grey, with main contrasts above shown by darker, blackish hands and dark grey tail-end, and below by darker wing-tips, tail-tip and body, but in many lights simply looks uniformly dark (and, in any case, older birds more uniform blackish). **Adult female** As male but somewhat darker overall, so contrasts even less marked, except that rump paler and bluish and, in good view, usually pale throat visible. **Juvenile** Above, brownish-slate with indistinct narrow paler fringes, darker primaries, darker head and only marginally greyer tail; below, body and wing-linings buffish with variable but rather diffuse streaking usually concentrated on upper flanks and across breast (can create impression of dusky breast-band), while linings more barred than streaked and contrasting with darker remiges which pale-barréd at bases and with broad dark trailing edges and wing-ends, and tail thinly barred (except central pair) with quite broad blackish subterminal; plain buff cheeks and throat contrast with blacker moustaches and hood. **First-summer** Like adult but generally browner and darker, and still with barred juvenile wings and tail creating some contrast below (trace of bars sometimes remains into second autumn).

**GEOGRAPHICAL VARIATION** Monotypic. This and Eleonora's Falcon [291] sometimes considered to form a superspecies.

**MEASUREMENTS** ♂ wing 264–283 mm, ♀ 273–297 mm; ♂ tail 127–135 mm, ♀ 130–141 mm; ♂ tarsus 32–36 mm, ♀ 34–37 mm. **Weights** No data.

**REFERENCES** Alerstam (1980), Ali & Ripley (1979), Bahar el Din (1984), Booth (1961), Brown *et al.* (1982), Cade (1982),

Clancey (1968a), Clark & Schmitt (1999), Clark *et al.* (1990), Cramp & Simmons (1980), Frumkin (1984, 1986, 1988, 1993), Frumkin & Clark (1988), Frumkin & Pinshow (1983), Gaucher *et al.* (1988, 1994), Génsbøl (1986, 1995), Ginn *et al.* (1980), Goodman *et al.* (1989), Hollom *et al.* (1988), Kemp & Crowe (1993), Kemp & Kemp (1998), Langrand (1990), Marlean (1993), Moreau (1969), Milton *et al.* (1973), Pickford *et al.* (1989), Porter *et al.* (1981, 1996), Richardson (1990), Roberts (1991), Shirihai (1996), Shirihai *et al.* (1996), Walter (1973c), Zimmerman *et al.* (1996).

## 293 APLOMADO FALCON *Falco femoralis* Temminck, 1822

Plate 105

**DISTRIBUTION** Neotropical and, very marginally, extreme south Nearctic (22°N with outposts at 27–30°N and formerly as far north as 34°N, where reintroduction programmes now started – to 55°S); order 5–6; extensive latitudinal distribution but, though locally fairly common, in general very thinly scattered, no better than scarce, and often decreasing. Southernmost North America (until c 1952, captive bred releases from 1993), Central America and locally throughout South America except Amazonia; captive-bred release programme started in USA within former range (southern parts of Arizona, New Mexico and Texas, also in north Mexico); otherwise patchily in Mexico (once more widespread over north and centre but now, apart from plateau of Chihuahua in north and isolated parts of Oaxaca on Pacific slope, confined to Caribbean side from Veracruz to west Campeche) and, in Central America, now only Belize, the Mosquitia region of east Honduras and northeast Nicaragua, and south-central Panama; thence, unevenly, through South America to Tierra del Fuego, except for Pacific slope of Colombia and forested Amazonia; breeds Isla Margarita (Venezuela) and has nested Trinidad.

**MOVEMENTS** Generally sedentary, but altitudinal movements from high Andes down to coastal Peru and Chile and evidently at least partial migrant in Patagonia. (Long regarded as migrant in Central America, too, but existing populations apparently resident.) Occasional records outside current range and on islands, and small migrant 'flocks' in southeast Brazil in August, suggest additional nomadic or other movements by at least immatures. One reached Sea Lion Island, in Falklands [Islas Malvinas], in February 1993.

**HABITAT** More or less open country, including savannah grassland, scrub-steppe, cactus desert, marshland with scattered trees, and wide range of other open areas from extensive lowland agriculture with shelterbelts to high Andean páramo-puna zones. Sometimes in and around small woods and plantations, but not extensive forest. Sea-level to 4,600 m, mostly below 1,700 m or, in Andes, above 2,800 m.

**FIELD CHARACTERS** Medium-sized slim falcon, at distance very grey above and distinctively patterned on head and tail, with relatively small head, longish wings, longish round-tipped tail. Crepuscular when hunting; not especially shy; perches very upright, often openly on bare branches or tops of trees or bushes, or on telegraph poles or fences, but equally often within cover of foliage, and sometimes on ground; wing-tips well short of tail-tip. Sexes generally similar in plumage, but females usually clearly bigger (less obviously so in high Andes), different races averaging 10–19% larger (up to 32%) and 42% heavier (2–121%); juvenile broadly similar, but distinguishable on fair view.

**PERCHED Adult male** Above, all blue-grey to slate-grey (different races) apart from uniquely patterned head with cream to buff supercilia joining across nape (where deeper buff to rufous) and separated from cream to buff cheeks and throat by black eye-stripes and narrow but obvious moustaches; blackish primaries and tail, latter with white tip and five to six thin whitish bars above; chest cream to pale rufous, often with short blackish streaks, separated from deeper tawny-rufous belly and thighs by finely white-banded blackish cummerbund widening on flanks. **Adult female** Similar, but usually more heavily streaked on chest, more thinly lined with white on breast. **Juvenile** Not dissimilar, including head pattern, but altogether duller; dark brown above with thin cinnamon edges and six to seven less distinct tail-bars, heavy blackish streaks on duller buff chest, buff streaks on browner cummerbund, and paler cinnamon



belly and thighs. **Bare parts** Eyes dark brown. Adult cere, orbital rings and legs yellow to orange-yellow, juvenile paler.

**FLIGHT** Mid-sized slender falcon with longish, thin and very slightly round-tipped wings, and longish rounded tail; wingspan 2.2 times total length. Rapid flight with fast shallow beats, slower and more buoyant when not hunting, often low over ground; glides and soars on flat wings or, in gliding, wrists may be depressed and tips upcurved; hovers when intended prey in cover. **Adult** Above, very obviously grey to brownish-grey (but darker in high Andes) except for whitish to buff or rufous of supercilia joining in V across nape, white-tipped uppertail-coverts, five to six whitish bars on blacker tail, and conspicuous white trailing edge to secondaries and inner primaries; whitish supercilia and cheeks and clear black moustaches often obvious from below, but white trailing edges less so, partly because black underwings, though in field often simply appearing all dark, are finely white-banded; only three to four tail-bars show from below and general impression is of mainly dark falcon with pale chest, often somewhat black-streaked, separated by black band (narrowest in centre) from rich tawny-rufous thighs, belly and crissum. **Juvenile** Broadly similar, but darker and browner above, much more heavily blackish-streaked on duller buff chest, buff edges on browner cummerbund, paler cinnamon belly and thighs; six to seven less obvious whitish tail-bars above, four to five below.

**CONFUSION SPECIES** Although superficially patterned something like Bat and Orange-breasted Falcons [299, 311], those are both much more thickset, with obviously shorter tail and relatively shorter and broader-based wings (Bat clearly smaller, too); they are also darker (difference much greater than suggested by plate 105), with plain black head, no separate moustaches, and much less obviously barred tail; both are also typically forest birds. Perhaps more likely to be mistaken, at least at distance, for Peregrine Falcon [309], though that, again, is far more thickset, with broad-based wings and shorter tail, thicker moustaches, and quite different pattern below; from above, it lacks the white trailing wing-edges.

**VOICE** Has been described as less sharp *rrrrrr...* than given by other falcons but, in alarm near nest, typical *keee-keee-keee...* is shrill penetrating scream. Single notes written as sharp *keeh*, or high-pitched woodpecker-like *cuerk* in series several seconds apart.

**FOOD** Birds, large insects; also some small mammals, including rodents and bats, and reptiles. Significance of bird prey well shown in east Mexico and Chile: well over 90% of food biomass; 50 species in one study; average weight 88 g, but to size of tinamous (Tinamidae), small ducks, chachalacas (Cracidae), snipes *Gallinago*, pigeons and parrots; some pairs successfully hunt Grey breasted Seedeaters *Thinocorus orbignyianus* in western and southern Argentina (M Pearman). Insects, such as orthopterans and beetles, apparently form only 3–6% of prey biomass, but are commonly taken and, as for some other falcons, may be seasonally more important; these are often hawked in air and eaten on wing, but may also be taken in sallies from perch. Strongly crepuscular and mostly hunts birds at dawn, insects later

and at dusk; mainly watches from either high open or somewhat concealed perch, then makes long level attack-flight with tail-chase as necessary, or may snatch rodents, lizards and small snakes from ground. More than most falcons, pair may work in tandem (in one study, two-thirds of all bird-hunts, with success rate of 45%, compared with only 21% when one falcon alone). Male often initiates attacks, calling female if she does not follow: she will dash into cover to flush out birds, even chasing them through dense foliage or even on ground, while male sails or hovers overhead. Soar-hunting also reported. Pirates food from other raptors and, in one case, Little Blue Heron *Egretta caerulea*, and strongly attracted to grass fires for any animals displaced. Marked RSD widens spectrum of available prey and, on average, pair hunting together takes larger birds.

**SOCIOSEXUAL BEHAVIOUR** Singly or, very often, in pairs; briefly family parties. As with other typical falcons, aerial displays varied and spectacular.

**BREEDING** Surprisingly few data. Timing obviously varies enormously over 85° of latitude, ranging from February–August in Mexico to September–January in central Argentina and November onwards in southern Chile. Uses old nest of another raptor (especially Chimango Caracara [258] in Argentina, but also buteos, kites and, in Central America, corvids), or occasional 'ledge' formed by epiphytic growth, in tree, shrub or cactus at 2–15+ m; adds no material. Clutch 2–3 (2–4). Incubation 31–32 days (once). Fledging c30–35 days.

**POPULATION** Even if Amazonia be excluded completely, species extends over at least 12 million km<sup>2</sup>, but very thinly in much of this vast area and often, at best, scarce. No clear data on densities, but, if average only, say, 1 pair/100–250 km<sup>2</sup>, total population could be in high tens or low hundreds of thousands. Decline possibly almost throughout 20th century in USA (where formerly nested southeast Arizona to south Texas, last in New Mexico in 1952) and north Mexico, but reintroduction programmes started there in 1993; remains exceedingly scarce and local in Central America. Little evidence to support suggestion that this species may actually gain from deforestation for agriculture, because of aversion to habitat disturbance and other human pressures. Over 20% of total range is in Argentina, where declines apparent, perhaps as result of pesticides (shown to affect this species in east Mexico), in both the pampas wheat belt and Patagonia.

**GEOGRAPHICAL VARIATION** Three races.

*F. f. femoralis* (lowland South America, mainly below 1,700 m, ?Panama) Smallest; slightly browner-grey above (except in much of Argentina and Chile, where quite clear grey), crown darker, supercilia more buff, cummerbund narrower but complete.

*F. f. pichinchae* (temperate montane South America, mainly in páramo-puna zones above 2,300 m from Colombia to northwest Argentina) Larger; dark slate-grey above, richer rufous below, chest more streaked, cummerbund divided.

*F. f. septentrionalis* (Central America, ?to Nicaragua) Size much as *pichinchae*, but paler blue-grey above, whitish to rufous below, cummerbund complete.

**MEASUREMENTS** *F. f. femoralis* ♂ wing 226–234 mm, ♀

245–282 mm. *F. f. pchinkar* ♂ wing 235–272 mm, ♀ 290–311 mm. *F. f. septentrionalis* ♂ wing 248–267 mm, ♀ 272–302 mm; ♂ tail 172–193 mm, ♀ 192–207 mm; ♂♀ tarsus 48–60 mm. **Weights** *F. f. septentrionalis* ♂ 208–305 g, ♀ 271–460 g.

**REFERENCES** Blake (1977), Bond (1972), Cade (1982), Clark & Wheeler (1987), Clark *et al.* (1989), Contreras *et al.* (1990), de la Peña (1992), Donazar *et al.* (1995), Ehrlich *et al.* (1992),

Ejlska & Krabbe (1990), Friedmann (1950), Haverschmidt (1968), Hector (1980, 1981, 1985, 1986, 1987), Hilty & Brown (1986), Howell (1972), Howell & Webb (1995), Humphrey *et al.* (1970), Jaksic & Jiménez (1986), Jiménez (1993), Johnsgard (1990), Johnson (1965), Kell *et al.* (1980), Ligon (1961), Mader (1981), Meyer de Schauensee & Phelps (1978), Olrog (1979), Palmer (1988), Ridgely & Gwynne (1989), Sheppard (1978), Sick (1993), Snyder & Snyder (1991), Sibley & Skutch (1989), Wetmore (1965).

## 294 MERLIN

*Falco columbarius* Linnaeus, 1758

Plate 106

**Other names:** Taiga/Prairie/Black Merlin (subspecific names in North America, where species formerly 'Pigeon Hawk'), Pallid Merlin (palest race in Asia)

**DISTRIBUTION** Holarctic, and in winter northern Neotropical and marginally Indomalayan (breeding from c69–72.5°N south to at most c43°N; winter mainly 54–30°N, but north to 62°N in western North America, 65°N in Iceland and 58–60°N in Scotland and Norway, and south to equator or beyond in northwestern South America and to 20°N in southeast Asia); order 6+; widespread but often sparsely distributed, especially after marked declines during 1960s and 1970s, and not generally increasing again. Circumpolar low arctic to cold temperate North America and Eurasia, much of Alaska (except north and west) and Canada (Yukon to Newfoundland, north beyond Arctic Circle in west but entirely south of 57°N in east) south into northern USA (south to south Oregon and central Wyoming in west, but only just into Great Lakes states and north Maine in east); in Iceland, Faeroes, Ireland, west and north Britain, and across northern continental Eurasia from much of Fennoscandia, Estonia, north and east Latvia, and northern Russia, through Siberia and central Asia to Anadyrland, and south to Kazakhstan, Lake Baikal, Ussuriland and Sakhalin.

**MOVEMENTS** Most populations entirely migratory, but dark 'forest' race of northwestern North America (*suckleyi*; see Geographical Variation) largely sedentary and two other subspecies (*richardsoni* of North American prairies and *subarsalon* of Iceland) only partially migra-

tory; very locally (especially in Britain and Ireland), western Eurasian *arsalon* may be sedentary, or no more than altitudinal migrant. Northernmost populations move south from late August into September, continuing south through October into November and, though starting return from end February through March, do not arrive back until April or even May. In Nearctic, *richardsoni* winters mainly within USA but also south to Central Mexico, while nominate *columbarius*, most migratory of all races and only one that reaches equator, winters south through Mexico (most commonly Yucatan Peninsula) and Central America into northwestern South America (south to north Peru and east to north Venezuela), October–April/May. Most *subarsalon* leave Iceland for Britain, Ireland and, to lesser extent, adjacent continent from Netherlands to southwest France. Continental Palearctic races winter in northwest Africa, southern Europe (but north to south Sweden), Mediterranean islands, parts of Middle East south to Egypt, and thence across south-central Asia mainly between c40°N and c20–25°N (south to Iraq, Iran, north India, south China, South Korea and Japan), but there is much overlap between subspecies in winter quarters. Thus, westernmost *arsalon* winters east to Afghanistan and probably northern India; east Siberian *insignis* winters west to Iraq and Iran (and has occurred in Egypt) and east to Japan and Vietnam; and *pallidus* of the western Asiatic steppes winters from east Turkey to northwest India. As vagrants, *columbarius* from North America has wandered to Scotland (Outer Hebrides) and in South America to French Guiana and Brazil;



6+

land populations are all evidence of previously unsuspected adaptability. Nesting Merlins are scattered over some 8.5 million km<sup>2</sup> of New World (more than one-third of North America) and perhaps 12 million km<sup>2</sup> of Old (nearly one-quarter of Eurasia), a total of something over 20 million km<sup>2</sup>. Breeding densities of 5–10 pairs/100 km<sup>2</sup>, or 1 pair/10–20 km<sup>2</sup>, have been recorded locally in both Britain and North America, on which basis a population of at least 1 million pairs might be postulated. Available habitat is unevenly distributed, however, and such a figure is arguably far too high. On present evidence the densest populations are in Europe, especially Iceland (500–1,000 pairs in late 1980s), Britain and Ireland (750–950 pairs in 1980s/90s), Fennoscandia (8,000–18,500 pairs in late 1980s) and European Russia (estimated 30,000 pairs in early 1990s), plus smaller numbers in Baltic states and Belarus (330–500 pairs). These estimates total 40,000–50,000 pairs in an occupied area of around 3 million km<sup>2</sup>, which would suggest an average density of 1.3–1.6 pairs/100 km<sup>2</sup>, or 1 pair/63–77 km<sup>2</sup>; applied to the world range, that might indicate something around 300,000 pairs. But even that may be too high. We have no data from northern Asia, and the American densities may be lower than the European: for example, Saskatchewan's 'minimum 2,000 pairs' in 652,000 km<sup>2</sup> might indicate only 0.3 pairs/100 km<sup>2</sup>, or 1 pair/325 km<sup>2</sup>. It seems reasonable to put the world population of these birds in the upper six-figure range.

**GEOGRAPHICAL VARIATION** Nine races, but differences in size and colour saturation more or less clinal in Eurasia.

*F. c. columbarius* (northern North America from Alaska to east Canada, south in mountains of western USA; highly migratory, many wintering in Central and northwest South America and Caribbean) Smallest; rather dark, increasingly so eastwards, and heavily streaked below; tail-bars stronger than in European races, so tail looks black with pale bars.

*F. c. suckleyi* (coastal forest of southeast Alaska and British Columbia; largely sedentary, some wandering south to California) Hardly larger; much darker, including head and tail, and male more blue-black above; pale supercilia reduced or absent, throat more streaked, underbody heavily marked, crissum barred, pale tail-bands incomplete or very indistinct.

*F. c. richardsoni* (prairies from Alberta and Saskatchewan to Wyoming and western Dakotas; partially migratory, wintering west to Pacific and south into north Mexico) Averages larger; much paler than *columbarius*, including head and tail markings.

*F. c. subcaesalon* (Iceland; mostly migratory, wintering Ireland and west Britain, sometimes to continental Europe and southwest Norway) Larger; fairly dark, but subsidiary black tail-bars thin and incomplete.

*F. c. aesalon* (Faeoës, north Europe and west Siberia; at least partially migratory Britain and Ireland, entirely so elsewhere, wintering south to Mediterranean and east to Iran) Very like *subcaesalon*, but averages smaller.

*F. c. insignis* (central and east Siberia; migratory, wintering south to north India, Korea and Japan)

Clinally slightly larger and paler towards east, with whiter forehead and less streaked below.

*F. c. pacificus* (far east Siberia from southern Anadyrland and north coasts of Sea of Okhotsk to Sakhalin; migratory, wintering south to Japan and north China) Averages larger than *insignis*, and darker again, more like European races.

*F. c. lymani* (mountains of central Asia; migratory, wintering south into China) Similar to *insignis*, but markedly longer-winged than all other races.

*F. c. pallidus* (steppes of western Siberia and Kazakhstan; migratory, wintering southern Asia from east Turkey to northwest India) Averages larger than *insignis*, much paler than all other races.

**MEASUREMENTS** *F. c. columbarius* ♂ wing 182–200 mm, ♀ 193–215 mm. *F. c. suckleyi* ♂ wing 186–197 mm, ♀ 207–215 mm. *F. c. richardsoni* ♂ wing 195–203 mm, ♀ 210–228 mm. *F. c. subcaesalon* ♂ wing 201–214 mm, ♀ 220–238 mm. *F. c. aesalon* ♂ wing 191–210 mm, ♀ 209–233 mm; ♂ tail 114–127 mm, ♀ 122–141 mm; ♂♀ tarsus 35–39 mm. *F. c. insignis* ♂ wing 199–211 mm, ♀ 218–231 mm. *F. c. lymani* ♂ wing 221–242 mm, ♀ 241–263 mm. *F. c. pallidus* ♂ wing 202–214 mm, ♀ 223–235 mm. **Weights** *F. c. aesalon* ♂ 125–234 g, ♀ 164–300 g. *F. c. insignis* ♂ 164–190 g, ♀ 155–205 g. *F. c. pallidus* ♂ 166–188 g, ♀ 224–261 g.

**REFERENCES** Ali & Ripley (1978), Armitage (1932), Beaman & Madge (1998), Becker & Sieg (1985), Bengston (1975), Bergman (1961), Bibby (1986, 1987, 1993), Bibby & Nattraas (1986), Bijleveld (1974), Blake (1977), Brauning & Lichtner (1970), Brazil (1991), Brennecke (1951), Brown (1976), Brown *et al.* (1982), Buchanan (1988), Buchanan *et al.* (1988), Cade (1982), Campbell & Ferguson-Lees (1972), Carlsen (1992), Cave & Macdonald (1955), Clark (1985a), Clark & Schmitt (1999), Clark & Wheeler (1987), Cosnette (1990), Cramp & Simmons (1980), Dekker (1988), Dementiev & Gladkov (1951), Dickson (1973, 1988, 1991), Enderson *et al.* (1991), Eichelcopf & Húe (1978), Fjeldså & Krabbe (1990), Flint *et al.* (1984), Forsman (1999), Fox (1971), Galushin (1981), Gænsbøl (1986, 1995), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Greaves (1968), Hagemeijer & Blair (1997), Hagen (1952), Hamas & Zusi (1992), Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1983), Hård & Enemar (1980), Harris *et al.* (1989), Hilty & Brown (1986), Hodson (1976), Hollom *et al.* (1988), Howell & Webb (1995), James & Oliphant (1986), James *et al.* (1987), Johnson & Coble (1967), Kemp & Kemp (1998), Kjellén (1992), Laing (1985), Lawrence (1949), Mead (1973), Meek (1988), Newton & Haas (1998), Newton *et al.* (1978, 1986), Noble & Elliott (1990), Oliphant (1985), Oliphant & Haug (1985), Oliphant & Thompson (1978), Page & Whitacre (1975), Palmer (1988), Parr (1991), Porter *et al.* (1981, 1996), Roberts (1962), Roberts (1991), Rodriguez-Duran & Lewis (1985), Rogacheva (1992), Rudebeck (1951), Shirihai (1996), Sick (1993), Sieg & Becker (1990), Snyder & Wiley (1976), Sodhi (1991), Sodhi *et al.* (1991, 1993), Sperber & Sperber (1963), Stirling (1993), Stubhart (1943), Sunyer & Viñuela (1996), Svensson *et al.* (1999), Swen *et al.* (1992), Temple (1972a/b), Thompson *et al.* (1989), Utendörfer (1952), Vaurie (1965), Warkentin & Oliphant (1985), Warkentin *et al.* (1992), Wheeler & Clark (1995), White (1994), Wiklund (1982), Williams (1981), Witherby *et al.* (1939).

numbers winter as far north as Kenya highlands and Lake Victoria basin in East Africa and, probably depending on extent of rains, north to Senegal, Chad and Niger in West Africa. In southern Asia, winters Pakistan (NWFP south to east Baluchistan and Sind) and widely throughout rest of Indian subcontinent (except Sri Lanka) south to Maldives, north Burma (south to Shan States), northwest Thailand (rare) and southeast China. Has wandered casually to Madeira, Canary Islands, Seychelles, south Thailand, north Laos, south Japan (Kyushu, Shikoku, Miyake-jima), Indonesia (once each to Java and Timor) and, just possibly, Pacific's Mariana Islands (Guam, Pagan).

**HABITAT** Needs trees, but not too many; breeds at temperate forest edges with good openings, and in broken woodland, but also commonly in more open country where woodland scattered or taller trees present as clumps, riverside lines, shelterbelts or hedgerows, including heathland, wooded steppe, farmland, timbered swamps and extensive wetlands, as well as close to human settlements in arid areas; adjacent low vegetation may range from scrub to reedbeds, wherever insects and small birds plentiful. Both early and, especially, late in breeding season, has clear affinity with wetlands. Comparably in sub-Saharan Africa, while favours woodland and wooded savannah and found also in open grassland, bush, farmland, and sometimes even town parks and suburbs, characteristically often based near rivers and waterholes, or extensive floods with dead trees. Typical of lowlands and foothills, but regionally, especially in Asia, also in seasonally drier uplands and mountains. Mostly sea-level to 1,500 m, more locally to 2,000 m, even 3,000 m, and Himalayan population 1,200 m to 4,000 m.

**FIELD CHARACTERS** Smallish, slim falcon, characterised by conspicuous whitish throat and double-peaked cheeks emphasising bold black moustaches, and by rufous thighs and crissum, with long wings and longish tail (both averaging shorter, and wings slightly less pointed, on juvenile). Partly crepuscular; perches very upright, shoulders hunched, within canopy or, more often, openly on high branch, sometimes on low twig, small shrub or ground; wing-tips reach tail-tip. Sexes very similar and little apparent difference in size, though females mostly 3–5% larger, not quite so slim or thin-winged, and average over 30% heavier (bulkiest may be nearly 50% heavier); juvenile easily distinguished on fair view; as adult after first moult but, while body-feathers moulted at any time in March–September of first summer, most remiges and rectrices not until second winter.

**PERCHED Adult male** All dark slate to brownish-slate above, including plain tail, with blacker crown and narrow black moustaches almost cutting off front of cream to pale buff cheeks, which have double peak and form half-collar to edges of slightly rufous-tinged nape; short thin white streak above each eye; throat also plain cream to pale buff, while ground colour of densely blackish-streaked breast, belly and flanks varies individually and regionally from whitish to rufous-buff; thighs and crissum rich rufous, usually plain but sometimes slightly streaked; pale bars on undertail also tinged rufous. **Adult female** Slightly browner above, but this

usually reliable only in direct comparison; more often some black streaks on rufous thighs and crissum. **Juvenile** Duller and browner above, thinly edged rufous-buff so that crown in particular appears more mottled; head-sides otherwise much like adult, with similar black moustaches and obvious pale cheeks extending back as half-collar; tail more clearly tipped and also laterally barred buff; much as adult below, if tending to be more heavily streaked, but thighs and crissum buff to dull rufous-buff (not contrastingly rufous) and more streaked. **First-year** More uniform above (though remaining duller) as pale tips wear off, but timing of moult variable; in first summer may have buff or strongly rufous thighs and crissum or, more often, mixture. **Bare parts** Eyes dark brown. Adult cere and orbital skin yellow, juvenile bluish-grey. Adult legs yellow, juvenile greenish, changing to pale yellow.

**FLIGHT** Small, slender raptor characterised by thin wings with relatively short arms and long pointed hands curved back enough to give scythe-like shape not unlike large swift *Apus*, but with relatively long squared or very slightly wedge-tipped tail (tail actually shorter than those of most other sympatric smaller falcons); wingspan 2.5 times total length. Stiff beats can be relatively slow and shallow in normal flight, and may or may not be mixed with glides, but faster, deeper and more flicked and energetic when hunting birds and then always interspersed with short flat glides until final stoop or tail-chase; hunting of flying insects altogether more graceful and spectacular, involving mix of slow and fast beats, short glides, agile turns, soaring on slightly backswept wings, and eating prey by bringing one foot up towards bill; glides with wings flat or slightly depressed; high soaring in aerial displays involves fully outstretched and level or slightly depressed wings, and more or less spread tail; rarely hovers and then only momentarily. **Adult** Uniformly dark above, including plain tail (slight pale tip in fresh plumage), but with conspicuously contrasting creamy check-patches that peak both at back into near-collar and at front, emphasising the thin dark moustaches; ends of moustaches also show from below against creamy-whitish throat, while plain or barely black-streaked rufous thighs and crissum form conspicuous reddish patch at rear of body; otherwise, chest to belly heavily dark-streaked, and whitish to rufous-buff wing-linings more or less conspicuously spotted and barred; undersides of flight-feathers and tail more clearly, if narrowly, dark-barréd on greyish-white, but often whole underwings and tail appear rather uniformly greyish with darker tips. **Juvenile** Tends to look blunter-winged and shorter-tailed, but very similar in pattern: less uniformly dark above with buff-speckled crown, pale-edged wing-coverts and body-feathers and, sometimes most obviously, thin buff mid-wing line along tips of greater coverts; secondaries and, especially, tail often more clearly pale-tipped, while sides of spread tail may show slight barring; pale check-patches, near-collar and throat strongly buff-tinged, but as conspicuous as on adult; pattern below also similar, except that thighs and crissum are buff or, at most, rufous-buff (not really rufous) and usually more or less streaked; cere and orbital rings can sometimes be seen to be drab, not yellow. **First-year** Often remains duller above through first summer, and has buff or mixed buff

and rufous thighs and crissum, as well as worn juvenile flight-feathers and tail (no pale tip).

**CONFUSION SPECIES** Overlaps, mainly in northern winter, in sub-Saharan Africa, and in India and southeast Asia, with African and Oriental Hobbies [296, 297] (similar in shape and flight, if averaging smaller and relatively slightly shorter-winged and shorter-tailed, but quite distinct through entirely rich rufous underparts – fairly plain or plain as adult, streaked and barred as juvenile – without boldly contrasting white cheeks and throat). More likely to be confused, in appropriate areas and seasons, with certain plumages of four other falcons (though even juvenile Northern Hobby generally appears darker and more uniform, both above and below): juvenile and, to lesser extent, older plumages other than adult male of Western Red-footed [289] (only subtle differences in shape and wing action, including slightly blunter tips and broader bases to more loosely flapped wings, and often longer-looking tail, but frequent hoverer, with paler crown, more or less barred uppertail, plainer and paler underbody and wing-linings, more broadly barred undersides to flight-feathers and – applying to juvenile only – wide pale forehead, full collar, paler and more mottled mantle and upperwing-coverts, broad dark trailing underwing-edges); juvenile and female of Eastern Red-footed [290] (shape and actions as Western, including hovering, and many of same features apply, but darker-headed, while beware that adult female, though distinguished from Northern Hobby by red legs and cere, looks all dark above, if obscurely barred, and, although blotched rather than streaked below, has pale rufous thighs and crissum); juvenile and adult of pale-morph Eleonora's [291] (distinctly larger, with broader wings and longer tail, different and often slower flight, similarly conspicuous but less extensive cheek-patches behind broader longer moustaches and, from below, more rufous-buff and less clearly streaked body, greyish flight-feathers with contrastingly darker wing-linings and, on juvenile, trailing edges); and juvenile of Sooty [292] (similar in shape and patterns of face and underbody, and not always larger or longer-tailed, even if tail more distinctly wedge-tipped, but cheek-patches more buff, body streaking thinner and weaker, wings two-toned above and below, broader subterminal tail-band underneath). See also smaller thrush-sized Merlin [294], as well as much heavier, broader-winged juveniles of Peregrine [309] and related species.

**VOICE** Normally silent except in courtship and latter stages of rearing young. Most commonly noted calls are those quickly repeated in excited contexts, from greeting or warning to protest or anger: clear plaintive *tee-tee-tee-tee-tee...* and slower, more slurred and disyllabic *tyew tyew tyew* which recalls Wryneck *Jynx torquilla*, also soft and slow but accelerating *tee tee tee-tee-tee...*; and loud shrill *kree-kree-kree-kree-kree...* rapidly and continuously uttered against human intruders close to nest, especially when young well grown. Both sexes use all variations, but male generally higher-pitched. Apart from harsh *chit* reported two to three times and various other single notes, mostly at nest, thin whistling *kirr-ik* and more trilling *kik-kirrrr* used, often in series, in aerial displays.

**FOOD** Primarily insect-eating falcon that usually

switches to small birds during incubation and fledging; occasionally, small mammals and, very locally in more open steppe, reptiles (mice sometimes pirated from Common Kestrels [277] and perhaps terrestrial vertebrates obtained mainly in such ways). In Africa almost entirely insects, especially alate termites and, as elsewhere, many dragonflies, moths, beetles, and locusts and other orthopterans; but at times, perhaps particularly before migrating north again, takes larks, pipits *Anthus*, queleas *Quelea*, and, notably, Barn Swallows *Hirundo rustica* and wagtails *Motacilla* gathering at roost; also bats at dusk. In Eurasia, as broad generalisation with many exceptions, typical food pattern is flying insects (moths, beetles, many mayflies and other essentially aquatic insects, some dragonflies) until eggs laid; then mainly birds (especially high-flying hirundines and swifts *Apus*, song-fighting larks and pipits, and flocking juvenile finches, sparrows *Passer* and starlings *Sturnus*) until soon after young fledge; then insects again, this time including many dragonflies, which in some areas often become dominant prey in August and early September and which the young seem to learn to catch first; later in September, in pre-migration period, more birds taken again, especially at roosts of passerines and small waders. For many flying insects and roosting birds, evening is peak of activity, but in fledging and post-fledging periods diurnal insects and birds caught much more. Forages mainly on wing, often quite low, catching prey in feet in level flight back and forth or after short stoop, sometimes swooping up at end; also still-hunts from high or low perch, and sometimes forages for insects on ground. Insects often, and very small birds occasionally, are eaten on wing, but other prey usually taken back to perch. In Africa attracted to bush fires, also by thunderstorms which cause emergence of swarming termites.

**SOCIOSEXUAL BEHAVIOUR** Usually in ones and twos, or family parties, and even on migration often singly or in small loose groups, occasionally larger numbers in straggling streams; but sometimes roosts socially (in trees) in spring before breeding (first-summerers may possibly do same in June and July). In Africa during northern winter, though still often solitary, more commonly roosts socially and also concentrates in tens up to 100 or more, with other insectivorous falcons, near thunderstorms (for termite swarms) and at other rich feeding areas (such as grass fires). Aerial displays include much high-circling, perhaps often very high, by male or pair. Low and high chases, often silent but sometimes noisy, particularly include male diving at female, and female rolling over, but male may also shoot up and loop the loop, turn over and over sideways, twist, bank and tumble down or dive towards ground in series of stepped stages and, in courtship, follows long glide with bout of twisting from side to side on very rapidly fluttering wings before plunging down towards perched or flying female, finishing with circles or figures-of-eight; dives may be accompanied by vaguely snipe-like drumming noise from wings. Spectacular aerial food-passes may be carried out in lightning snatch at extreme converging speeds or, if male does not let go, both may tumble, locked on, for several metres. Chasing intruders also involves wide variety of usually noisy dives, swoops, tumbles and, sometimes, locked talons.

**BREEDING** June–August (occasionally from late May in extreme south), so chicks in nest when recently fledged passerines abundant, and learning to fly when dragonflies numerous. Lays in unoccupied nest (usually one built in current year) of, most commonly, Carrion/Hooded Crow *Corvus corone*, less often of another corvid or accipitriform raptor (notably Northern Sparrowhawk [145]), sometimes of Grey Heron *Ardea cinerea*, rarely of Woodpigeon *Columba palumbus* or squirrel *Sciurus*, at 8–20 m (4–32 m) in conifer or broadleaf, which may be isolated or in clump, in hedgerow or avenue line, in emergent tree on wooded slope, or near glade or clearing in more extensive woodland or forest; crow nests on electricity pylons in open country have also been used in at least Britain and Israel, and cliff-top nests in Russia; no material added, but old lining may be removed. Clutch 3 (2–4). Incubation 27–31 days. Fledging 28–34 days; independent after further 20–40 days.

**POPULATION** In 1982 Cade suggested world total of 30,000–60,000 pairs, but a dozen years later the estimate for European Russia alone was 40,000–70,000 pairs and for the rest of Europe and the Mediterranean Palearctic perhaps 30,000+ pairs, with some of the higher figures in the 1990s including around or over 1,000 pairs in each of Ukraine and Germany, 1,100–1,600 pairs in Belarus, 1,000–2,000 in Poland, over 2,000 in Turkey, 2,400–2,800 in Netherlands, 1,500–3,500+ in Spain, 2,000–3,000 in France, 2,500–3,000 in Finland and 3,000–5,000 in Israel (one of most southerly nesting areas in West Palearctic). The vast breeding range extends over 25–30 million km<sup>2</sup> and, though the species was considered in the 1950s to be less common in the eastern parts of the former USSR than in the west, it seems reasonable to hazard a guess on the density in Asia being at least half as high as in Europe. If the European and Mediterranean population is as many as 95,000 pairs, and the Asiatic half the density over twice the range, total approaching 200,000 pairs is indicated. This may seem high, but, if German forest densities of 1 pair/2.4–4.8 km<sup>2</sup> (nests often 2–5 km apart there and elsewhere in Europe, and down to 400 m in Israel) were applicable to whole range, the total number of birds could even run into seven figures. On smaller scales, as further justification for these enlarged numbers, the British population, long thought only about 100 pairs, is now considered to be 500–1,000 pairs (probably through better observation as well as actual increase), while Portuguese figure similarly rose from guessed 'few' in 1979 to calculated 300+ pairs by 1985. Local numbers do fluctuate markedly as result of weather and disturbance, but it must be concluded that the population as a whole is stable and, in some areas, increasing. Despite assumptions of historical declines, has been little affected by many of the threats commonly acting against raptors: as it is often crepuscular and its food spectrum does not conflict with game interests, and as it migrates fast by night as well as by day, the numbers shot are perhaps smaller than they might be both in summer quarters and on passage (though Maltese hunters thought to account for 500–1,000 annually); pesticides have apparently had limited effect, perhaps because of the high proportion of aerial prey (though increased pesticide usage in some African winter quarters is unknown quantity); its nests are only

locally at risk from egg-collectors and very little from falconers; and, since it is not tied to extensive woodland, deforestation is not a major problem (though dense commercial planting can be). On the other hand, nest predation by crows and squirrels after human disturbance is growing threat in increasingly disturbed environments: as many as half the nests in one study area have been found to fall to crows. And, though the average production of young per successful nest can be as high as 2.3–2.4, and is 1.4–1.8 overall, wet summers may result in almost complete failure with, perhaps, a drop in breeding population in subsequent years. Moreover, increased predation by Northern Goshawk [153] may further depress breeding success, while recent marked declines over much of Europe in certain avian prey populations, especially larks and hirundines, could prove additional limiting factor.

**GEOGRAPHICAL VARIATION** Several named subspecies, including 'jakutensis' (northern Eurasia), 'jugurtha' (drier regions of north Africa to central China) and 'centralasiac' (Turkestan and north Iran through Himalayan region), simply reflect an inconstant clinal tendency for the species to be darkest in northern Eurasia and palest in southern Asia, while ground colour of underparts varies individually from rich buff to whitish. Only two races now recognised.

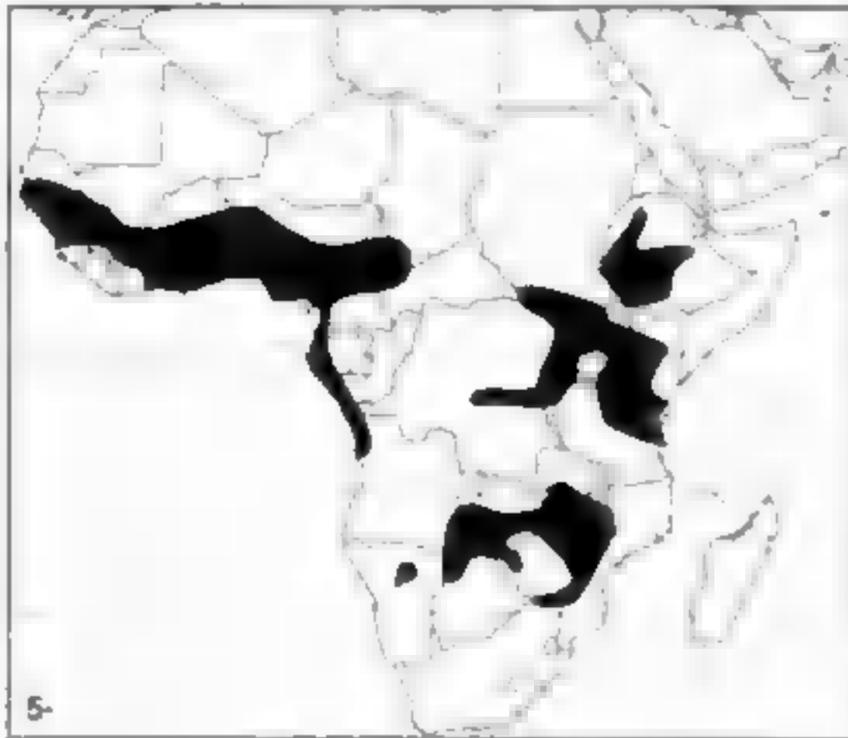
*F. s. subbutro* (throughout, except southeast China) Averages longer-winged; highly migratory.

*F. s. strichi* (southeast China, from south Shaanxi south to northwest Yunnan, Guanxi, Guangdong and Fujian, as well as north Laos, possibly northeast Burma) Averages shorter-winged; short-distance migrant or even sedentary. Northern Hobby sometimes considered to form superspecies with other hobbies [296–298].

**MEASUREMENTS** *F. s. subbutro* ♂ wing 257–279 mm, ♀ 248–286 mm; ♂ tail 116–143 mm, ♀ 125–145 mm; ♂ tarsus 32–35 mm, ♀ 33–38 mm. *F. s. strichi* ♂ wing 232–253 mm, ♀ 251–257 mm. **Weights** *F. s. subbutro* ♂ 131–232 g, ♀ 141–340 g.

**REFERENCES** Ali & Ripley (1978), Beaman & Madge (1998), Bemis (1975), Bijleveld (1974), Bijlsma (1980), Brazil (1991), Brazil & Hanawa (1991), Britton (1980), Brown (1976), Brown *et al.* (1982), Cade (1969, 1982), Campbell & Ferguson-Lees (1972), Catley (1994), Cheng Tso-hsin (1987), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Etchécopar & Hùe (1978), Ferguson-Lees (1994), Fiuczynski (1978, 1987, 1991), Fiuczynski & Nethercole-Thompson (1980), Flint *et al.* (1984), Forsman (1999), Fuller *et al.* (1985), Galushin (1981), Gensbol (1986, 1995), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Grimmett *et al.* (1998), Hagemeijer & Blair (1997), Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1983), Hou *et al.* (1990), Kemp & Crowe (1993), Kemp & Kemp (1998), Kjellén (1992), Knystautas (1993), Kostzewa (1985, 1986, 1987, 1989, 1991), Lekagul & Round (1991), Marchant *et al.* (1990), Martin (1992), Moreau (1972), Morel & Roux (1973), Newton (1979), Parr (1985), Patrikeev (1993), Pepler (1991, 1993), Pickford *et al.* (1989), Portelli (1994), Prince & Clarke (1993), Revnokis (1973), Richardson (1990), Roberts (1991), Rufino *et al.* (1985), Schuyt *et al.* (1936), Shirihai (1996), Shirihai & Christie (1992), Shirihai *et al.* (1996), Simson (1966), Small (1995), Steyn (1982), Thiollay (1975a/b, 1989), Tinbergen (1952), Trodd (1993), Utendörfer (1952), Vaurie (1965), Vielliard (1972), Walpole-Bond (1914, 1931, 1938), Witherby *et al.* (1939), Zimmerman *et al.* (1996).

**DISTRIBUTION** Afrotropical (14°N to 27°S); order 5; widespread, but only very locally common, generally scarce, often uncommon, frequently rare. Sub-Saharan Africa: Senegambia, Guinea, Sierra Leone and Ivory Coast, through Ghana, Togo, Benin, Nigeria, Cameroon, Central African Republic, and southern Chad and Sudan, to western and central Ethiopia, thence south through East Africa, Malawi and southern DR Congo to Zambia, northeast Namibia, northern Botswana, Zimbabwe, Mozambique and northeastmost South Africa.



**MOVEMENTS** Various sedentary and nomadic, perhaps in relation to food supply. Does not occur much outside main range, though a wet-season vagrant (sometimes breeding) in northeast Kenya and occasionally wanders southwards along Indian Ocean coast of South Africa to Natal and eastern Cape Province.

**HABITAT** Damp wooded savannah, open woodland and forest edge, occasionally extensive clearings within forest; in parts of West Africa associated with palms. Often apparently avoids areas of considerable human disturbance but locally, notably in Uganda, has become relatively common where Pied Crows *Corvus albus* (and their nests) abundant in once forested and now densely populated regions; then even found breeding in Kampala and other towns. Sea-level to 3,000 m.

**FIELD CHARACTERS** Smallish, slim, dark falcon, blackish, rufous and buff in all plumages, with long wings. Basically crepuscular, spending much of day perched high and inconspicuously, with upright stance, in tall trees, including palms; tips of wings reach end of tail. Sexes similar, but female averages 7% larger and perhaps 25% heavier; juvenile also rather similar, but distinguishable in good view; moults direct into adult plumage, probably towards end of first year.

**PERCHED Adult** Dark grey to slaty-black above, blackest on head, with black moustaches offset by rufous-buff cheeks and throat, this colour sometimes extending spottily on to nape; and all rich rufous below, finely streaked with black on breast and flanks. **Juvenile** Very similar, but duller browner-black above with thin rufous

edges on back and wing-coverts, and more broadly and obviously streaked below. **Bare parts** Eyes dark brown. Adult cere and orbital rings yellow, juvenile greenish-white at first. Legs yellow.

**FLIGHT** Small raptor with long, thin pointed wings that make longish tail look relatively short, and combine with slim body to give swift-like silhouette in high flight; wingspan 2.3 times total length. Flat, stiff beats interspersed with short glides, speed varying according to whether simply foraging or chasing prey; soars on flat or slightly depressed wings angled at carpal joints, often with tail spread, mixing this with fast flight when hawking insects; hovering apparently not recorded. **Adult** Looks all blackish above and, but for faintly buff-barréd flight-feathers and tail, largely rufous below; rufous-buff wing-linings, like richer rufous breast and flanks, are faintly black-streaked. **Juvenile** Best distinguished from adult in flight by much more broadly streaked wing-linings, but in evening light this difference may be hard to see.

**CONFUSION SPECIES** In eastern Africa, from Ethiopia to Zimbabwe, sometimes misidentified as Taita Falcon [312]; see discussion under that species. Otherwise likely to be confused only on shape with larger and relatively longer-winged Northern Hobby [295], which distinguished in all plumages by plain cream throat and cheeks, and by lack of rufous on both dark-barréd wing-linings and heavily streaked breast. See also female Western Red-footed Falcon [289].

**VOICE** Usually silent except at nest. Main calls then rapid *kee-kee-kee...* used in both greeting and alarm. Also high-pitched scream, *heeee-ee* or *kiki-kee*, which may be related to courtship.

**FOOD** Out of breeding season, probably almost entirely flying insects: alate termites, grasshoppers, locusts, beetles and cicadas recorded. When female incubating and, particularly, when young being raised, high proportion of small birds, such as waxbills, weavers and swallows, but also species to size of doves. Single records of amphibian and small mammal. Largely crepuscular, hunting from evening well into dusk, also at dawn. All bird and insect prey caught on wing, almost exclusively by pursuit-flight, which may start from high perch or during fast-foraging among or at edge of trees; hunts mainly low over ground or at 50-100 m up. Insects usually eaten in flight, while birds taken to tree perch.

**SOCIOSEXUAL BEHAVIOUR** Generally solitary or in pairs, but feeding concentrations of up to 20-30 may occur when termites or locusts swarming. At least some pairs remain together throughout year. Often very noisy early in breeding season, but aerial displays apparently rather limited: mutual circling and pursuit-flights occur and, as with Northern Hobby [295], these perhaps under-recorded if taking place at great heights.

**BREEDING** February-June in Ivory Coast, December-June in Uganda and west Kenya, April-June and August-December elsewhere in equatorial East Africa, and September-January from Zambia southwards. Makes

**298 AUSTRALIAN HOBBY**  
*Falco longipennis* Swainson, 1837

Plate 102

Other name: Little Falcon

**DISTRIBUTION** Australasian and, in Wallacea, marginally Indomalayan (8°S to 42°S, north to 7°S in austral winter with vagrants to equator); order 5; widespread but generally uncommon. Australia and Indonesia: northern Tasmania, much of Australia, and Lesser Sundas from Lombok to Wetar and Timor (but breeding proved only on Flores).



**MOVEMENTS** Though often apparently sedentary, even sometimes as far south as Tasmania, at least southern race (see Geographical Variation) is partially migratory and probably juveniles everywhere are dispersive. Small numbers from Australia pass through Torres Strait and winter solitarily in southern New Guinea, occasionally wandering farther north and west in both Irian Java and Papua; vagrants of southern race have also been recorded east to New Britain and west to southern Moluccas, even Ternate (north Moluccas) and Kalaotoa (south of Sulawesi). Longest ringing recovery 1,000 km, from Canberra to Brisbane.

**HABITAT** Eucalyptus and other open woodland, belts of trees along watercourses, including closed semi-deciduous forest in Sumbawa, well-timbered suburban parks and gardens; particularly near water, though sometimes even over almost treeless plains and semi-desert scrub. New Guinea winter habitats include open country, savannah, grassland, lagoons and suburbs. Mostly sea-level to 1,000 m, but to 1,500 m in Lesser Sundas, and perhaps 2,000 m in New Guinea winter quarters.

**FIELD CHARACTERS** Smallish, slim falcon, slaty, rufous and cream as adult, with long wings and shortish tail. Perches upright, usually in trees, often conspicuously on crowns or dead branches but sometimes also inside canopy, and also on artificial structures; wing-tips reach or exceed end of tail. Sexes rather similar, and slight overlap in size, though largest female may be up

to 21% bigger than smallest male; juvenile separable until completion of moult into adult plumage by early in second year.

**PERCHED Adult** Mainly dark slate-grey to paler blue-slate above (see Geographical Variation), tinged brown when worn; blacker helmet or hood, extending down into short broad moustaches, sharply delineated by cream to buff forehead, throat, and distinctive half-collar extending up behind rear cheeks at edges of nape; tail finely but obscurely barred; below, rich or pale rufous, sometimes no more than deep buff, variably streaked on breast (often indistinctly) and more blotched, arrow-marked, spotted or barred on flanks. (Female tends to be browner above and more heavily marked below.)

**Juvenile** As adult but for rufous edges above, somewhat richer rufous below and more buff throat, neck-sides and upper breast, variably but usually thinly streaked on chest and flanks, paler and unmarked on thighs, belly and crissum. Acquires brown tinge with wear as approaches first moult. **Bare parts** Eyes dark brown. Adult cere and eye-rings pale grey (second year?) to yellow, juvenile pale blue. Feet yellow, juvenile duller and paler.

**FLIGHT** Sometimes crepuscular. Small, slender raptor with long, narrow, pointed wings with tapered tips and curved trailing edges and relatively long, narrow squared tail; scythe-like wing shape and dashing flight speed suggestive of large swifts (Apodidae); wingspan 2.3 times total length. Wingbeats, interspersed with short glides, vary from slow, flat and stiff in ordinary travel to fast, deep and flickering in pursuit-flight; glides on flat or slightly drooped wings with backswept tips; soars with outstretched wings flat but hands turned slightly back at carpal joints, leaving curved trailing edges. **Adult** Mainly dark slate-grey to paler blue-grey above, but rump and indistinctly barred tail paler, head and flight-feathers blacker; half-collar obvious from side; mainly rufous to rich buff below, wing-linings streaked like breast, flight-feathers and tail barred greyish and rufous, wing-tips dark. **Juvenile** Broadly similar, but looks duller and browner above with more rufous head and side-collar; thinly streaked underbody may appear almost uniform.

**CONFUSION SPECIES** On shape and flight, let alone colours, should not be mistaken for any other Australian falcon, likeliest possibilities being juvenile Peregrine [309] (larger, obviously stockier, with broad triangular wings with squared tip, straight trailing edge, flat to upswept at tips, short broad tail, heavier flight, different head pattern), female Australian Kestrel [282] (similar size but broader wings with rounded tips, heavier, longer and less tapered tail, more laboured flight, underwing contrast, and markings) and, in dry inland Australia, just possibly Grey Falcon [300] (larger, more Peregrine-shaped, mainly white below). On swift-like shape alone, perhaps more likely to be confused in eastern Australia during October–April with almost comparable-sized migrant White-throated Needletail *Hirundapus caudacutus* (clear white throat and vent). But in Indonesia and Papua New Guinea needs to be distinguished from Oriental Hobby [297], which smaller, shorter-tailed, without upcurving half-collar or defined moustaches;

dramatically and young falcons fledged, those may form over 40% of biomass eaten. Bats do not generally exceed 15% of prey items or biomass, but some falcons near bat roosts specialise more. Hunts mainly within 100 m of open perch in dead tree top with wide view, whence can fly at, tail-chase, dive on to or power upwards at passing prey, most of which taken in air, some from edge of tree or bush, few snatched from ground or even water. Also flies fast low over canopy or bushes, apparently to flush prey; or soars well above ground, grabbing at, especially, large insects or stooping on to birds below. Small prey often eaten on wing. Hunting activity most marked at dawn and dusk, continuing well after sunset. Extreme RSD considerably widens food spectrum available and results in markedly different-sized prey being taken by the two sexes, which have also been found to use different techniques for catching bats.



**Fig. 58.** Reversed sexual dimorphism (RSD) is a feature of most raptors, but nowhere is it so marked as among the bird-eating accipiters and falcons (see pp. 35–39). The Bat Falcon *Falco ruficularis* [299], which takes virtually all its prey on the wing, and many more birds (including swifts and hummingbirds) than bats, is one of the more extreme examples. The female averages about one-fifth (up to one-third) larger than the male and two-thirds (up to 2 times) heavier. The pair is thus able to harvest a wide spectrum of different-sized prey

**SOCIOSEXUAL BEHAVIOUR** Singly or, often, in pairs; briefly family parties. Intraspecific aggression demonstrated by 'head-enlargement', erecting slightly elongated feathers of cheeks and upper neck into conspicuous flared hood, of 'almost cobra-like appearance'. As with other typical falcons, aerial displays varied and spectacular.

**BREEDING** Timing varies greatly over 55° of latitude, but in tropics onset related to dry season. Mainly February–June in Middle and northern South America down to at least 4°N, but eggs in August at 3°S in Brazil, where full season might then be August–December,

while October–February more likely in north Argentina. Usually nests in cavity, most commonly at 10–50 m in cavity in tree (which may be isolated, or well inside forest), or sometimes in cliff face or ruined building (also recorded in crown of oil-palm, in termite mound, and on cross-bar of crane in sugar mill); adds no material. Clutch 3 (2–4). Incubation not recorded. Fledging c35–40 days (once).

**POPULATION** Range limits enclose some 13 million km<sup>2</sup>. Neighbouring pairs exceptionally recorded only 1.3 km apart, but Cade suggested that normal average densities might vary from 1 pair/100 km<sup>2</sup> to 1 pair/1,000 km<sup>2</sup>, on which basis he surmised population of 'several tens of thousands of pairs', which, with non-breeders and immatures, would certainly result in low six-figure individual total. Even allowing for species' disappearance from some extensively deforested regions, and continuing Third World usage of pesticides long banned in north temperate regions (18% eggshell-thinning shown by Kill *et al.* for Bat Falcons in Mexico), this seems reasonable minimum for what is still among commoner and most extensively distributed of New World falcons. It tolerates, and may even temporarily benefit from, partial deforestation, and often nests near human habitation (which in itself can be dangerous), but extensive clearance remains continuing threat.

**GEOGRAPHICAL VARIATION** Four races have been distinguished, but seem simply to reflect artificial stages in clines of decreasing colour saturation away from equator. We therefore do not recognise *petoensis* (west Mexico to west Ecuador) or *aphryophanes* (southwest from central Brazilian tableland), but follow B&A in regarding nominate *ruficularis* as occupying whole range except for northwest Mexico (south Sonora, Sinaloa), where greyer, lighter rufous and whiter-throated *petrophilus* is palest extreme. Alternatively, one can take *petoensis* (combining *petrophilus* with it) to represent all slightly paler populations of Central America to Ecuador, a view increasingly favoured by many recent authors.

**MEASUREMENTS** (all 'races' combined) ♂ wing 175–197 mm, ♀ 201–229 mm; ♂ tail 88–102 mm, ♀ 103–118 mm; ♂♀ tarsus 32–39 mm. **Weights** ♂ 108–148 g, ♀ 177–242 g.

**REFERENCES** Beebe (1950), Blake (1977), Cade (1982), Chavez-Ramírez & Eckerlin (1991), Chubb (1918), Cody (1969), Contreras *et al.* (1990), de la Peña (1992), French (1992), Friedmann (1950), Haverschmidt (1962, 1968), Hilty & Brown (1986), Howell & Webb (1995), Howell & Whittaker (1995), Inigo-Elias (1993), Kill *et al.* (1980), [Kirven (1976)], Meyer de Schauensee & Phelps (1978), Narosky & Yzurieta (1987), Parker (1991, 1993), Ridgely & Gwynne (1989), Schulenberg & Parker (1981), Sick (1993), Slud (1964), Sules & Skutch (1989), Teixeira *et al.* (1987), Voous (1969), Wetmore (1965)

size of crows, pigeons and parrots to size of Galah *Cacatua macroura*. Often said to take much prey on or near ground, more like Afro-Palaearctic Lanner [305] than most falcons, but other observers emphasise attacks like Peregrine [309] with spectacular stoops. May forage in flight by high-circling or low transects, and in fact seems to employ variety of aerial methods, including direct attack-flights, glide-attacks, stooping, fast contour-hunting, transect-hunting, skimming low (c3 m) above ground and taking prey by surprise in shallow swoop. Also still-hunts from perch, dropping on to vertebrates or insects on ground, or hawking flying insects to eat on wing like Australian Hobby [298]. Attends regularly at rich feeding areas, such as waterholes, and attracted to grasshopper plagues. At times hunts co-operatively, like other bird-eaters.

**SOCIOSEXUAL BEHAVIOUR** Adults often in pairs; fledged young remain in family groups; otherwise solitary. Aerial displays include high-circling and various forms of flight-play and mock-diving; soaring with series of rather shallow dives, frequently calling, with wings sometimes raised above body level; aerobatics with high flapping beats (similar to Brown Falcon [274]); slow-flying with aerobatics, culminating in talon-grappling and spiralling downwards; stooping, rolling and foot-touching.

**BREEDING** August–December (June–January). Lays in

old stick nest of crow or another raptor, with animal hair and strips of bark supposedly sometimes added, usually at 20+ m (6–25 m) in tall tree, often near creek or waterhole. Clutch 2–4. Incubation c35 days. Fledging 41–52 days.

**POPULATION** Limits of regular breeding distribution enclose some 3 million km<sup>2</sup>, perhaps more, but this least numerous of Australian falcons is apparently rare everywhere, if probably overlooked to considerable extent. No data on densities, but even in so large a range it would be unsafe to assume population above low thousands, possibly no more than hundreds; recent estimate of 1,000 breeding pairs, or fewer than 5,000 individuals. Copper & Copper saw only six pairs in five (?) years of searching and at last found one nest after travelling 12,000 km in 1979. No threats known.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 268–302 mm, ♀ 318–338 mm; ♂ tail 151–170 mm, ♀ 154–185 mm; ♂♀ tarsus 41–48 mm. **Weights** ♂ 336 g (one), ♀ 500–624 g.

**REFERENCES** Beecher *et al.* (1986), Blakers *et al.* (1984), Cade (1982), Coates (1985), Copper & Copper (1980, 1981), Czechura (1981), Czechura & Debus (1985a), DeRayn (1975), Frith (1969), Garnett (1992), Hall (1974), Hobbs (1972), Hollands (1984), Marchant & Higgins (1993), McGregor & McGregor (1983), Olsen & Marples (1993), Olsen & Olsen (1986), Olsen *et al.* (1993a/h), Prier-Jones (1983), Smith (1983).

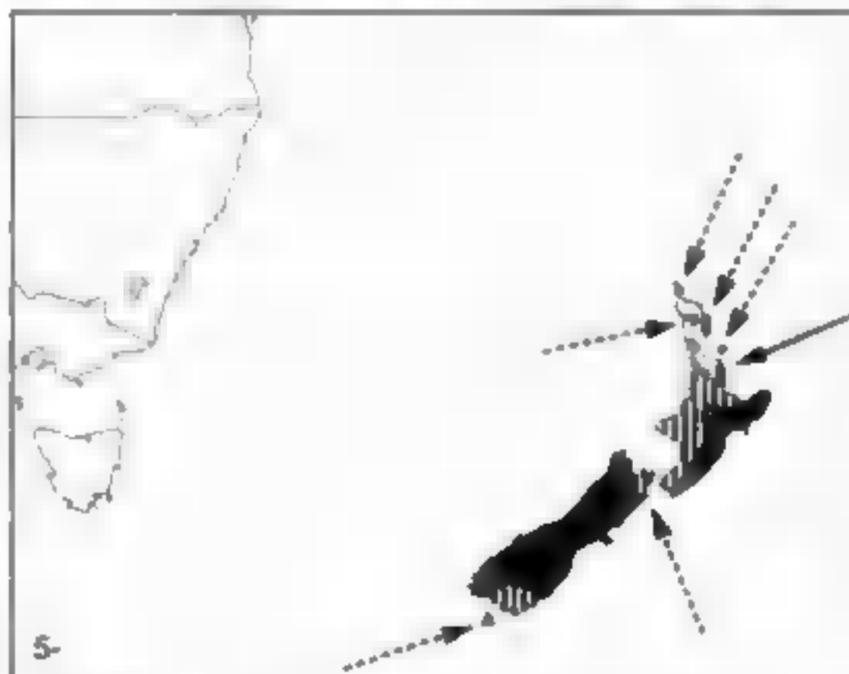
## 301 NEW ZEALAND FALCON

*Falco novaeseelandiae* Gmelin, 1788

Plate 104

Other names: Bush Hawk, Quail Hawk

**DISTRIBUTION** Australasian (37°S to 51°S); order 5; widespread and not uncommon. Endemic to New Zealand: both main islands (except Northland peninsula), together with Stewart and some smaller islands inshore and, 400 km farther south, Auckland Islands.



**MOVEMENTS** Adults often sedentary, juveniles more dispersive, but some move north for austral winter and others may descend from higher altitudes. Now only winter visitor north of Rotorua in North Island. In the south, vagrants have reached Campbell Island (53°S).

a further 250 km southeast of the Auckland Islands, making this the most southerly of all falcons apart from the three that breed in Tierra del Fuego.

**HABITAT** Originally indigenous forest and dense bush, with or without rocky outcrops, but in face of extensive deforestation has adapted to tussock grassland, other pastures and light scrub in countryside dominated by sheep-farming; indeed, at least 70% now live in such open areas (see Population). Wandering juveniles in autumn may visit urban gardens. Sea-level (but not sea-cliffs) to 1,500 m, occasionally to 2,100 m.

**FIELD CHARACTERS** Mid-sized to largish, powerful falcon, blue-black, rufous and creamy as adult, with relatively shortish wings and longish tail. Perches upright, often openly but also inside tree canopy; wing-tips well short of tail-tip. Sexes rather similar and, because plumages variable, often distinguishable only when seen together, female up to 33% larger and 23–136% heavier, but only up to 16% larger and 80% heavier within individual populations (see Geographical Variation); juvenile separable, beginning to moult to adult plumage towards end of first year, continuing well into second year.

**PERCHED Male** Blue-black above, with thin rufous to whitish edges and broken bars on back and wings; dark brown primaries and tail, latter with narrow greyish bands; slight rufous eyebrows, broad black moustaches, dark-streaked rufous cheeks and throat; otherwise most

302 **BLACK FALCON**  
*Falco subniger* GR Gray, 1843

Plate 103

**DISTRIBUTION** Australasian (mainly 25°S to 39°S, nomadic north to 11°S); order 4+; often scarce, but sometimes locally common. Endemic to mainland Australia: most breeding records come from eastern South Australia, Victoria, New South Wales and south Queensland, chiefly inland.



**MOVEMENTS** Various sedentary, dispersive, nomadic, migratory and occasionally eruptive; movements probably related to populations of wandering quails (see Food) and its own breeding success. Present in southern parts of range mainly from spring to autumn (September/October–February/April). Chiefly non-breeding migrant in northern Australia. Usually rare or absent much of Cape York Peninsula, top end of Northern Territory and most of Western Australia, but vagrants or small local irruptions may occur. Also vagrant Tasmania in summer and autumn.

**HABITAT** Sparse eucalyptus woodland, dry scrub, open plains, semi-desert, often near timbered creeks and waterholes and other wetlands; mainly in arid interior, but sometimes in exposed areas near coast. Outside breeding season, particularly if numbers high, may wander widely, foraging more over agricultural land and other less arid habitats. Sea-level to 1,000 m, mostly below 500 m.

**FIELD CHARACTERS** Largish to large, sleek, virtually all-dark falcon with small head, broad square shoulders, relatively long wings and tail, short legs, but big feet. Perches in open on dead branches, fence posts or rocks, often less upright than other falcons, even rather hunched with heavy shoulders; wing-tips nearly reach tail-tip. Apparently dimorphic ('sooty-grey' morph rare, only three birds known and no specimens). Sexes similar, but female 5–14% larger and probably considerably heavier; juvenile not distinguishable in field except by comparison with own parents.

**PERCHED Normal adult** Rather variably sooty-black to dark chocolate-brown, with or without grey bloom; sometimes virtually uniform except for inconspicuous blacker moustaches, but may have any or all of dark buff forehead or cheeks, white chin, white speckling on chest, or faint harring on undertail-coverts or tail. **'Sooty-**

**grey' adult** Upperparts described as slate-grey, similar in colour to Australian Hobby [298]. **Juvenile** Usually darker or blacker (though this often noticeable only beside parents), with very thin pale edges to mantle and smaller wing-coverts in fresh plumage; sometimes has white chin, faintly paler cheeks, obscure harring on quills. **Bare parts** Eyes brown. Cere and eye-rings pale blue-grey. Adult feet pale grey to dirty whitish, juvenile slightly bluer-grey.

**FLIGHT** Medium-sized all-dark raptor with longish wings broadest at carpal joints and sharply pointed, and longish squared tail usually closed into narrow taper but, if spread, showing single-stepped edges due to shorter outermost feathers; wingspan 2.1 times total length. Spends much time on wing; kestrel-like winnowing with rapid shallow flicks, or often slower and more leisurely beats, almost crow-like, but pursuit-flight fast and agile with deep vigorous strokes; soars and glides on slightly down-tipped wings forming arc, with carpals thrust forward and trailing edges straight. **Normal adult/juvenile** Appears uniformly blackish with at most faintly barred undersides of flight-feathers and tail looking only slightly paler than body and wing-linings; but grey legs and variable white chin often obvious, while any pale spots on chest and wing-linings may be visible on good view. Juvenile best recognised by complete flight-feathers and tail in summer and early autumn (November–March), when adults in moult. **'Sooty-grey' adult/juvenile** Apparently differs only in slate-grey, rather than blackish, upperparts.

**CONFUSION SPECIES** Likely to be confused with dark morph of Brown Falcon [274] though that, when perched, has more upright stance, obviously bigger head, paler cheeks, rounder shoulders, pot-bellied shape, distinctively longer legs, and short toes; and, in flight, shows more rounded tail often fanned, much more contrasted two-tone underwings with blunter tips, raised (not drooped) wings when soaring or gliding, and looser, deeper beats with rowing action and often erratic jinking. Greyest individuals might conceivably be mistaken for Grey Falcon [300], but that is paler above and far paler below, with shorter tail and orange-yellow bare parts, and glides and soars on level or slightly upswept wings. Similar-sized Peregrine Falcon [309] has larger head, shorter tail, and shorter and narrower wings held flat in glide. In slow flight, can be confused with large crow (prominent bill, rounder wings) or overlooked when soaring with Black Kites [39] (spread primaries, forked or triangular tail, loose plumage, pale wing-panels above).

**VOICE** Often silent, unusually so towards intruders in circumstances when many falcons noisy. Vocabulary does include deep chattering *kakakaka*, ... but commonest call at nest is harsh scream. Short clear screech during display-flights high-pitched and far-carrying. Contact notes include slow whine and soft whistle.

**FOOD** Particularly birds, also mammals, few reptiles, swarming insects, carrion. Bird prey often nomadic quails *Coturnix* and button-quails *Turnix*, and sometimes

introduced Common Starlings *Sturnus vulgaris*, but ranges in size from pipits *Anthus* to parrots, pigeons, ducks (to c1,060 g) and herons, and can include smaller raptors. Mammals less frequent, and usually small species, but at least sometimes, perhaps mainly in breeding season, many young rabbits. Also apparently feeds on carrion more readily than most falcons. Forages in various ways, including low transect, often along creek or irrigation ditch, or quartering at 10–20 m, or high soaring followed by spectacular stoop, or hovering, or observation from perch. Characteristically often circles high above shooters, horsemen, driven stock, tractors and harvesters, grass fires, and hunting harriers, waiting for terrestrial birds to be flushed. Catches many birds in flight during tail-chase, or knocks larger species to ground in stoop; may strike and hover over foliage in which prey hidden. Snatches some ground prey without landing, but will also pounce to ground or chase small animals on foot. Insects may be hawked in flight and eaten on wing. Will frequently pirate food from other raptors, and has been recorded preying on Letter-winged Kite [27]. Pairs sometimes hunt co-operatively.

**SOCIOSEXUAL BEHAVIOUR** Usually solitary or in pairs, but as many as six together feeding on locust plague. Aerial displays include high-circling, mutual chases, mock-dives and other forms of flight-play common to many falcon species.

**BREEDING** July–December (May–February/March); timing may be affected by drought, heavy rainfall or abundance of food. Lays in old stick nest of another raptor or crow (possibly sometimes after owners driven off), with no evidence of lining material added; usually

at 4–14 m in tall tree, often near creek or waterhole, and rarely on electricity pylon, but low nest in bush may be used if necessary. Clutch 3–4 (1–5), commonly 3. Incubation c34–35 days. Fledging 38–49 days.

**POPULATION** Limits of regular breeding range enclose less than 2 million km<sup>2</sup>, even though total distribution over twice as large. Densities vary from 1 pair/1.5 km<sup>2</sup> or 1 pair/4–5 km of watercourse to 1 pair/13.4 km<sup>2</sup> but, despite one record of four pairs nesting in under 60 km<sup>2</sup> of floodplain, this species is generally far scarcer, its irregular and nomadic breeding often dependent on abundance of favoured foods. Thus, whole population may not exceed upper thousands. No particular threats evident, though some egg-collecting, and young possibly taken for falconry purposes.

**GEOGRAPHICAL VARIATION** Monotypic, though basic colour may be any shade from dark brown to sooty-black, and presence or absence of generally small paler areas or obscure markings on forehead, cheeks, chin, chest, undertail-coverts, wing-linings and undersides of flight-feathers and tail individually variable. 'Sooty-grey' morph clearly very rare: only one known record, of two adults with juvenile in South Australia.

**MEASUREMENTS** ♂ wing 347–376 mm, ♀ 386–424 mm; ♂ tail 200–226 mm, ♀ 223–257 mm; ♂ tarsus 40–50 mm, ♀ 43–57 mm. **Weights** ♂ 510–710 g, ♀ 610 g–1.0 kg.

**REFERENCES** Baker-Gabb (1969), Bedgood (1979), Bakers *et al.* (1984), Cade (1982), Copper & Copper (1980, 1981), Czechura & Debus (1983b), Fraser (1985), Frith (1969), Hollands (1984), Hutton (1991), Marchant & Higgins (1983), Olsen (1975), Olsen & Marples (1993), Olsen *et al.* (1993).

### 303 PRAIRIE FALCON *Falco mexicanus* Schlegel, 1851

Plate 108

**DISTRIBUTION** Nearctic (summer 53°N to 24°N, winter 52°N to 21°N); order 5-; fairly common to common in north of relatively restricted range, more uncommon and local farther south. Western North America and Mexico: breeds southwest Canada (southern parts of British Columbia, Alberta and Saskatchewan) and western United States (east to westernmost Dakotas, extreme northwest Nebraska, much of Colorado and New Mexico, and western Texas) into northern Mexico (northern Baja California and from northeast Sonora, Chihuahua and west Coahuila south to Durango and northern San Luis Potosí).

**MOVEMENTS** Breeding and winter distributions show much overlap, and some winter even in southernmost Canada (southern Alberta and Saskatchewan, and southwest Manitoba); but this species often highly dispersive or nomadic outside breeding season, particularly in relation to food supply, then extending westward, southward and, more extensively, eastward. In western United States, breeding cycle closely linked to activities of ground squirrels, adults arriving in nesting areas in January when these mammals emerge after five to six months underground, and adults and juveniles leaving in June–July when the squirrels' aestivation



begins. In heat of July–August some falcons move up to montane tundra, and with onset of colder weather there are altitudinal movements down from higher regions above c2,000 m. Perhaps more sedentary in southern United States and Mexico, but numbers and distribution there increased by arrivals from farther north. Regular post-breeding expansion in United States extends

may even hover. Juveniles hover more frequently and may also flap along slowly, almost harrier-like.

**SOCIOSEXUAL BEHAVIOUR** Often solitary; where dispersive, apparently pairs only for breeding season, January onwards. Aerial displays include single and mutual high-circling, spectacular noisy dives, swooping at one another and chasing, much like other large falcons.

**BREEDING** March–July. Scrape on sheltered ledge, in deep recess or hole, or in old nest of accipitriform raptor or, especially, Raven *Corvus corax*, almost always on cliff, rocky bluff or steep river bank, typically at c10–100 m from base; exceptionally, subterranean holes, ledges of buildings, and tree and electricity-pylon sites; adds no material. Clutch 3–5 (3–6, Mexico usually 3–4). Incubation 29–31 days. Fledging 36–41 days.

**POPULATION** Breeding range extends over some 3.6 million km<sup>2</sup>, a rather restricted area compared with many New World raptors. Data centralised by Bureau of Land Management indicated population in range of 5,000 to 6,000 pairs (Cade), which would indicate density of 1 pair/600–720 km<sup>2</sup> and a total population, including immatures and other non-breeders, at the lower end of five figures. But distribution is very uneven: in Snake River Canyon, Idaho, around 200 pairs – sometimes more, sometimes less – breed in only 1.90 km of high cliffs and canyon walls, with linear density of c1 pair/0.65 km; nowhere else are numbers known to be comparable and in much of range, especially in southern United States and Mexico, breeding pairs only

fairly common or even uncommon. In California, traditional eyries were abandoned when grassland gave way to crops and, in Mojave Desert, when housing was developed around some isolated buttes. DDT and other agricultural chemicals, and taking of young by falconers, have had local adverse effects.

**GEOGRAPHICAL VARIATION** Monotypic. Various included in same superspecies as Laggart and Lanner [304, 305], sometimes also with Saker, Altai and Gyr [306–308], or – on chromosome studies – thought closer to Peregrine [309].

**MEASUREMENTS** ♂ wing 289–328 mm, ♀ 331–357 mm; ♂ tail 159–179 mm, ♀ 185–201 mm; ♂♀ tarsus 50–64 mm. **Weights** ♂ 420–635 g, ♀ 675 g–1.1 kg.

**REFERENCES** Allen (1987), Allen *et al.* (1986), Amadon & Bull (1988), Beauvais *et al.* (1992), Boyce *et al.* (1986), Cade (1982), Clark & Wheeler (1987), Enderson (1961), Enderson & Berger (1970), Enderson & Wrege (1973), Fyfe & Arnbruster (1977), Fyfe *et al.* (1969, 1988), Haak & Deaton (1979), Holthuijzen (1990, 1992), Holthuijzen *et al.* (1987), Howell & Webb (1995), Johnsgard (1990), Lanning & Hitchcock (1991), MacLaren *et al.* (1984), Marti & Braun (1975), Ogden & Hornocker (1977), Olendoff & Stoddart (1974), Oliphant *et al.* (1975), Palmer (1988), Platt (1978), Porter & White (1973), Roppe *et al.* (1989), Ruude & Anderson (1986), Schmutz & Oliphant (1987), Schmutz *et al.* (1991), Snow (1974), Snyder & Snyder (1991), Squires *et al.* (1993), Steenhof (1992), Steenhof & Kochert (1988), Steenhof *et al.* (1984), Webster (1944), Wheeler & Clark (1985), White (1962), Williams (1985), Wrege & Cade (1977).

## 304 LAGGAR FALCON

*Falco jugger* JE Gray, 1834

Plate 107

**DISTRIBUTION** Indomalayan (36°N to 11°N); order 5; evidently less common than formerly, now uncommon to rare in some parts. Indian subcontinent and neighbours: extreme southeast Iran, southeast Afghanistan, and Pakistan east through India (Himalayan foothills south to north Kerala and Tamil Nadu, east to Assam and Manipur), Nepal, Bhutan, Bangladesh and northwest Burma.

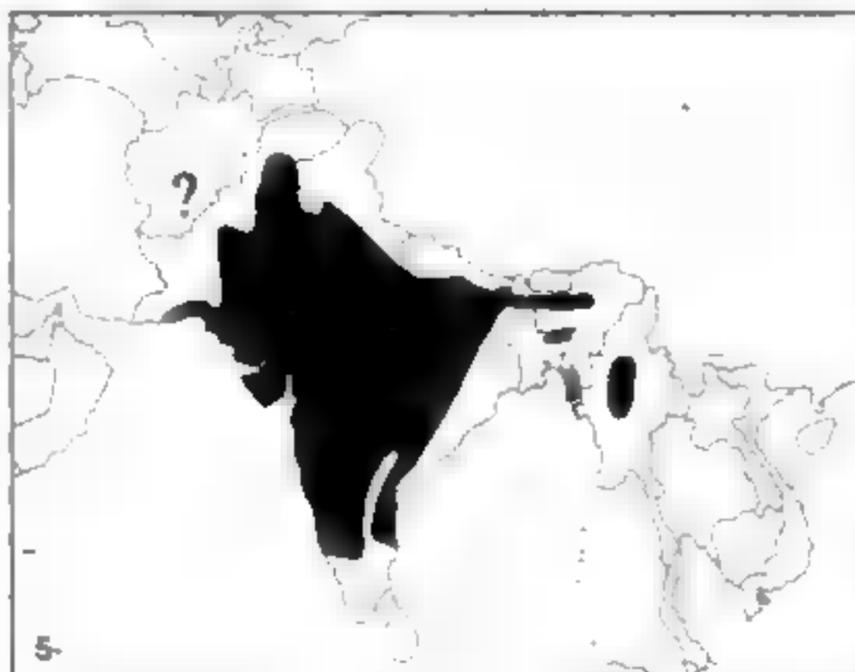
**MOVEMENTS** Generally sedentary, but partial local

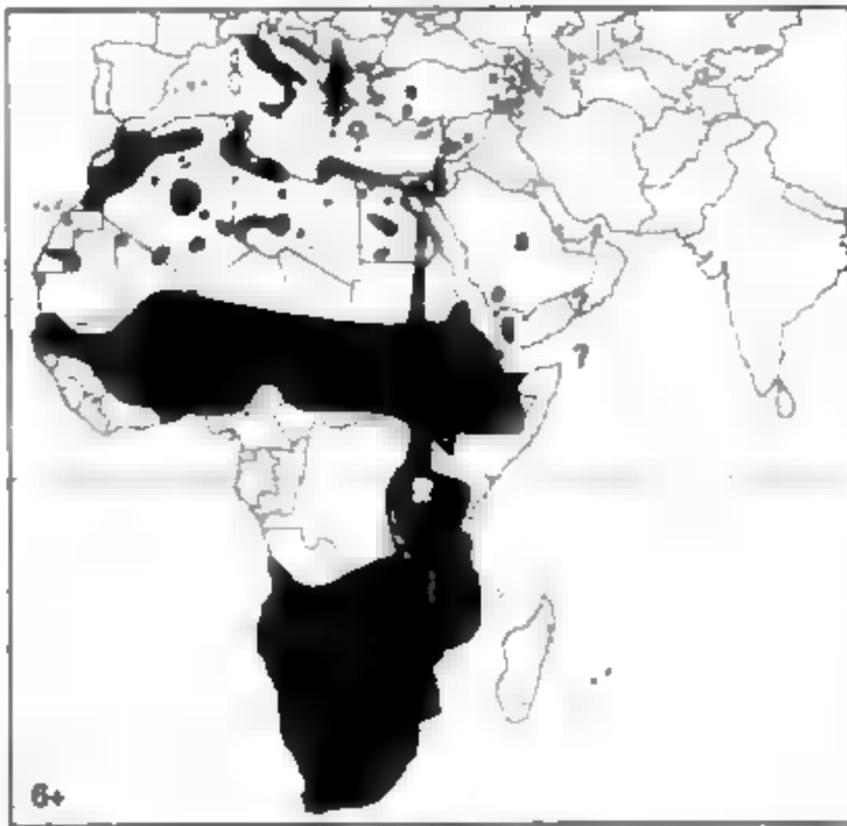
migration in India. Old specimens from southern Turkmenistan (c37°N) and northeast Uzbekistan (c41°N) indicate wider wandering or more northerly breeding.

**HABITAT** Dry open woodland, and open country with scattered trees, ranging from arid semi-desert and scrub to richer plains and cultivation; even edges of villages and sometimes in towns. Sea-level to 1,000 m; recorded as high as 1,980 m in Nepal, but this unusual.

**FIELD CHARACTERS** Medium-sized, slender falcon, as adult brown, whitish and rusty-crowned, with long wings and longish tail. Perches openly on poles, tree tops, rocks, even urban buildings; wing-tips just short of tail-tip. Sexes similar, but female averages 8% larger (up to 21%); juvenile distinct; as adult after completion of first full moult (body plumage mostly within first year, but quills not until into second).

**PERCHED Adult** Mainly plain dark brown to dark grey-brown above, finely edged buff, but black-streaked rusty-whitish to rufous crown and nape, more or less outlined in white on three sides (forehead and supercilia), above white or buff-white cheeks, surrounded by black on three sides (narrow moustaches, eye-stripes that also encircle the eyes, and curving lines around backs of cheeks); closed tail plain grey-brown with buff tip (though outer feathers barred); white to buff-white or





Israel and southwest Jordan into Sinai, and parts of Arabian Peninsula (known north-central, southwest, regular south Oman), possibly Socotra; and, in Africa, patchily from northwest and west Mauritania and Morocco across to Egypt, and from Senegambia east through southern half of Mali, Niger, Chad (except north) and central Sudan to Ethiopia and Somalia, then southward through East Africa (west to east Zaïre) and from west and north-central Angola to southernmost South Africa (absent from equatorial rainforest areas of west and centre).

**MOVEMENTS** Largely resident with some dispersal, especially by juveniles. While northern populations mostly sedentary, some juveniles and even few adults winter south to at least Middle East; some wandering, possibly over fair distances. Somewhat more mobile in sub-Saharan Africa, including regular north-south movements locally in West (e.g. Nigeria, where migrates north in rains), and some nomadism in eastern and southwestern regions, where sudden short-term local increases in numbers of juveniles and (presumably non-breeding, surplus) adults in arid areas after rain; ringing recoveries of up to 1,500+ km. Vagrancy rare, but recorded in Europe west to French Atlantic coast; true picture, however, clouded by possibility of falconers' escapes.

**HABITAT** Mostly open, especially dry, country and, in Africa, more adaptable than Peregrine [309], habitats ranging from extreme desert to forested mountains and, unlike that species, not restricted to areas with cliffs: desert and semi-desert, rocky wadis and canyons in barren uplands, both open and lightly wooded savannah and other grassland, and steppes-like habitats, also forest edge and open woodland if nests of other raptors or corvids available (see Breeding), and cliffs in mountain forests (e.g. west Kenya), but avoids heavily forested areas or those with high rainfall; in southern Africa breeds also in eucalyptus stands, and even adapted to urban areas both there and in parts of East Africa, so long as open areas nearby for hunting. At times forages over coastal sandy areas or mudflats, frequently so in parts of West Africa (e.g. Gambia), and over agricultural fields in some places (e.g. Middle East in winter). Sea-

level to c2,500 m, mostly to 1,200 m in Europe, but locally to 5,000 m in Africa.

**FIELD CHARACTERS** Medium-large to large falcon, as adult barred grey/grey-brown to slaty above with rufous to buff crown and variably plain or spotted below, with relatively small head, slender body, long wings and tail. Perches quite upright and openly on rock, tree branch, pylon, building or similar site, occasionally in cover, or on ground; wings level with or just short of tail-tip. Sexes similar, but female up to 15-20% larger and to 50+% heavier; juvenile distinguishable; as adult by second winter, though some that moult from as early as first autumn more adult-like by first summer, but probably does not breed until two or three years old.

**PERCHED Adult** Mainly greyish above (darker grey-brown in north, paler in desert areas and blue-grey in south) with pale edges and variable darker barring (bars most marked in north), paler tail prominently barred, with darker primaries; forehead whitish, but crown and nape rufous to light buff and variably streaked or plain, and outlined by black forecrown and black areas around eyes extending down into narrow moustaches and rearward as dark eye-stripes that continue to nape-sides, contrasting large white cheeks; throat and rest of underparts creamy, with well-spaced brown-black spots on chest becoming bars or arrowheads on flanks and (in Europe) trousers, but much regional variation (desert races less patterned, and in Afrotropical nominate *biarmicus* breast to vent light pinkish-cream with only few indistinct brown spots on flanks and thighs; see Geographical Variation). (Female larger but otherwise similar, though tends to be browner-tinged above and somewhat more patterned below.) **Juvenile** Much browner above, more streaked below, thus much closer in appearance to Saker [306]; above, dark brown and unbarred, feathers edged rusty to buffish, tail with fewer, more obscure, incomplete bars (normally restricted to sides) but broad creamy-buff tip; nape and crown vary from whitish-buff to pale rufous and heavily dark-streaked (in north) to almost plain, often with darker forecrown above creamy forehead, and always at least indication of pale buffish supercilia above contrasting dark eye-stripes, and thin dark moustaches in front of variably streaky cheeks; dirty white to creamy or light buff below, throat unmarked but otherwise all heavily streaked dark brown or black-brown, often more broadly on flanks/trousers, though crissum generally plain buff. (Some juveniles moult from first autumn/winter, then head pattern more adult-like, some barred feathers above and on flanks, yellower legs.) **First-summer** Similar to juvenile but heavily worn, more uniform above with pale edges abraded; earlier-moulted individuals closer to adult, but with juvenile wings and tail. **Bare parts** Eyes dark brown. Adult cere and orbital rings yellow, juvenile grey to green-grey or blue-grey. Adult legs yellow; juvenile initially grey to yellowish-grey, becoming more yellow from first winter. **FLIGHT** Medium-sized raptor, long-bodied and relatively small-headed, with long, rather blunt-ended wings (though hand long and tapering) and longish narrow tail; wingspan over 2.3 times total length. Flight often low over ground, comparatively slow with rather flat beats, but accelerates much faster with deeper beats in aerial pursuit; glides and soars on flat or slightly depressed wings, tips little upturned; does not hover.

**Adult** Greyish above (varying from grey-brown in north to paler slaty in desert areas and bluer-grey in south), palest on rump and, especially, tail, latter with 8–12 thin blackish bars, and with characteristic head pattern of rufous to light buff (variably dark-streaked or plain) crown, dark forecrown and pale forehead with contrasting blackish eye-stripes and thin moustaches outlined by creamy or white cheeks and throat; generally very pale-looking below, with sparse dark spots on chest to belly and leading underwing-coverts, more obvious bars on flanks and greater coverts (can give impression of dark wing-diagonal), obscurely barred whitish flight-feathers with dark trailing edges and wing-tips, and dark-barred undertail, but regional variation considerable and desert races (especially northwest African *ertlangyn*) less patterned below, while nominate in southern half of Africa has underbody pale pinkish with any spotting virtually invisible (see Geographical Variation). **Juvenile** Above, all uniform dark brown (rufous or buff edges visible only close to), tail barred at sides and broadly tipped creamy-buff, with lighter buffy-white to pale rufous crown either heavily dark-streaked or plainer-looking; below, whitish to light buff, with unmarked throat and variably streaky cheeks contrasting thin dark moustaches, and normally plain lower belly and crissum, while underbody and wing-linings (especially greater coverts) heavily streaked dark brown against thinly barred paler remiges with darker wing-tips and trailing wing-edges, and barred outer tail; linings occasionally either all dark or pale-mottled (cf. Saker [306]).

**CONFUSION SPECIES** Needs to be distinguished from Saker [306] primarily in north of range, from Mediterranean east to northwest Iran, but during September–April also, since that species migratory, down through East Africa (though Saker much scarcer there), while possible vagrants of either need to be borne in mind across wider area of Europe and elsewhere. Long wings, long body and long slim tail close to Saker (somewhat heavier, fuller-chested, broader-based wings, hands relatively shorter and less tapered, but these subtle differences masked by RSD when comparing female Lanner with male Saker), though tail projection much shorter: adults not too difficult in fair view, when grey-toned barred upperparts, rufous/buffish crown, spotted underparts with barred flanks and, in flight, paler less patterned underwing good distinctions from Saker (decidedly brown above, usually unbarred but rufous-fringed, crown normally densely dark-streaked whitish, pale supercilia, less obvious eye-stripes, tail-bars more spot-like, flanks and trousers heavily and broadly streaked but variable, well-streaked linings with greater coverts dark like flanks); barred eastern Sakers otherwise similar enough to western populations not to cause any additional problem, but 'sacernoides' variant with grever upperparts barred rearward, tail-bars more complete, barred flanks, paler less patterned wing-linings and even, rarely, part-rufous crown more like Lanner and probably not safely distinguishable at distance, although, in reasonable view, told by typical head pattern, usually rufous edges above, longer tail projection when perched. Separating non-adults far more difficult, even at closer ranges, especially since juvenile has slightly longer tail projection than adult, and best to concentrate on head pattern, upperparts, underside streaking and

underwing pattern (see Field Characters) which, in combination, and though both species highly variable, often indicative of Lanner rather than Saker (usually whiter crown with fewer but more even streaks, longer whiter supercilia meet on nape and merge with white forehead, less distinct eye-stripes usually not quite meeting poorly defined moustaches and thus isolating dark eyes, grevish-tinged upperparts with contrasting broader creamy-rufous edges, often broader-streaked flanks/trousers even forming solid patch, more extensively streaked belly area less distinct from unmarked crissum, flanks never barred; and, in flight, secondaries and hand contrastingly darker above, pale underprimaries with broken dark bars and whitish bases contrasting grever secondaries and better-demarcated wing-ends, linings more uniformly and broadly streaked, tail spotted – not barred – at sides); fact that legs often yellower from as early as first autumn/winter often useful (young Saker's legs blue-grey until at least first summer). Two other large falcons, superficially similar both as adult and as juvenile, are in Middle East and northern Africa Barbary [310] and throughout range Peregrine [309] (both smaller, heavier-built, relatively shorter and more pointed wings, shorter but broader tail not tapering at base, big head and bull-neck, deeper stiffer beats, different head, tail and underside patterns).

**VOICE** Usually silent away from breeding area. Calls much as those of other larger falcons: rather harsh screams and cackles, often in rhythmic series, varying in speed, length and pitch, and, compared with Peregrine [309], all higher-pitched though less loud and piercing. Commonest are shrill *whreer* or peevish *urek* and variants ('wailing call') and rasping *hek-hek-hek...* or fast *kre-kre-kre...* or sometimes slower *krace-krace-krace...* ('cacking call'), the two often combined as, for example, *kirrrr-rrrrr*, various other calls typical of large falcons.

**FOOD** Primarily small and medium-sized birds, also small mammals (rodents, bats), insects, locally reptiles, very rarely amphibians (toads); carrion occasionally eaten. Birds mostly in size range 50–500 g, from small passerines such as larks to medium-sized species such as pigeons and small gamebirds (especially quails), only exceptionally larger ones to size of francolins *Francoelinus*, ducks and even full-grown guineafowl and small bustards (1,500 g), though unable to carry these in flight: characteristically exploits bird flocks visiting desert waterholes to drink, sandgrouse being locally important prey, as are off-passage spring migrants (in northwest Chad, mainly Yellow Wagtail *Motucilla flava*, Hoopoe *Upupa epops*, Quail *Coturnix coturnix* and Turtle Dove *Streptopelia turtur*); raids colonial nests of queleas, and readily takes free-range domestic poultry (can be major food in places where easily obtainable and other food less so); waders frequently taken where present, and many records of smaller falcons caught and eaten. Breeding-season study in Sicily found Jackdaw *Corvus monedula* dominant prey (34%), with Lesser Kestrel [275] and Rock Pigeon *Columba livia* also significant, while almost solely domestic chicks brought to nest in Zimbabwe. Mammals usually only supplementary, but more frequent when bird prey scarcer, include rodents, especially Arvicanthis rats (Ethiopia), bats (mainly larger fruit-bats, also insectivorous species), rabbits. Though

lizards and snakes normally secondary prey, can be taken in greater numbers locally, and large spiny-tailed lizards *Uromastix* even main prey in some northern deserts. Insects sometimes commonly taken, especially emerging termite alates, locusts, grasshoppers, occasionally dragonflies, also spiders and scorpions in deserts, and even cats tenebrionid beetles which avoided by most birds. Some food cached. Hunts throughout day, and often crepuscular, perhaps at times even nocturnal. Prey seized in air, or on or near ground, in low-level horizontal surprise-flight from any approach angle, even head-on, or following very fast and spectacular stoop from higher soar or sailing flight; tail-chasing common if initial attack unsuccessful, and may continue for some distance. Rats and lizards snatched from burrow entrance, or in open in low swift flight. Pair-members not uncommonly hunt co-operatively, e.g. along cliff face or around waterhole, male flying some way behind female and seizing prey flushed by her; also learns to exploit activities of native hunters, grabbing prey they flush, and attends grass fires. Hawks aerial insects in slow flight. Although may pounce on ground prey from perch, and occasionally hunts on foot, these methods both clearly of lesser importance. Occasionally robs other raptors.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs; sometimes larger groups, up to 20 together, where prey localised (waterholes, grass fires) or temporarily abundant (insect emergences, quelea colonies). Normally breeds as solitary pairs, but polyandry recorded rarely. Aerial displays similar to other large falcons: mutual high-circling, sometimes accompanied by loud screaming calls, often leading into rapid aerobatics, including steep plunge followed by sudden sharp ascent, high-speed twisting chases, and male diving at female, who may roll over and present talons, or male may stoop at her at great speed in mock-attack.

**BREEDING** February–July in Europe and northern Africa, January–May in West and northeast Africa, June–October and December–March in East Africa, May–February (peak August–November) in southern Africa. Scrape on ledge of rock outcrop or steep cliff, occasionally on building, quarry face or even, rarely, on ground, or equally, especially in Afrotropics, in old nest of other large raptor, heron, stork or, particularly, corvid (commonly Pied Crow *Corvus albus* and Cape Rook *C. capensis*) in tree or on electricity pylon; no material added. Clutch 3–4 (2–6). Incubation 30–35 days (28 days also reported). Fledging 35–45 (33–47) days, with dependence c4–6 weeks.

**POPULATION** European population variously estimated at 225–250 pairs and 140–360 pairs, of which up to 80% in Italy (including 60–100 pairs Sicily), with fewer than 100 in former Yugoslavia and Balkan peninsula surely an underestimate (and no reliable data for Albania), and 10–100 in Turkey, but only single-figure population between Black and Caspian Seas. Though no figures for Mauritania, Algeria (said to be abundant), Libya, Jordan or Arabia, likely pair totals of under 50 in Syria (species quite common, though no definite breeding records), 25–30 in Israel, up to 500 in Egypt, 200–250 in Tunisia and over 1,000 in Morocco indicate a West Palearctic population of around 3,000 breeding

pairs. In sub-Saharan Africa, this is everywhere the commonest and most widespread large falcon, found in healthy numbers in all suitable habitats, even in areas with dense human population, and outnumbering Peregrine (309) by 36:1 in Transvaal, where total of 1,400 pairs estimated with home ranges averaging 40–50 km<sup>2</sup> (compared with best in Europe of 1 pair/60 km<sup>2</sup>, in Sicily); even though few accurate data known for rest of Africa south of Sahara, where this falcon is distributed over 13 million km<sup>2</sup> at very least and appears to be relatively less numerous only in West and locally in East, an average density throughout of as low as 1 pair/200 km<sup>2</sup> would give 65,000 pairs, but true figure almost certainly far higher. World population clearly runs well into six figures and, since breeding productivity and survival generally good, may well be nearer, or even reach, seven. Northern range has contracted somewhat since 19th century, when bred also southern Spain and, earlier, probably also south France, but species seems to have recovered well from rather marked decline in 1950–70 in Europe, where now stable, while in Africa, despite some local reductions (e.g. in south), appears to continue to thrive and even increase in that continent, where favoured by bush clearance and planting of eucalyptus stands and also adapts well to inhabited areas; proliferation of pylons, providing nest sites for corvids, also beneficial to this and other falcons. Main threats are direct persecution and, more importantly in some places, collecting of eggs and chicks for falconry; some limited competition for eyrie sites with Peregrine, but that species far less numerous in most of Lanner's range.

**GEOGRAPHICAL VARIATION** Five races, generally intergrading in northern Africa.

*F. b. biarmicus* (Angola, east Zaire, Uganda, south Kenya, southward to Cape Province) Distinctive; bluer-grey above with obscure bars, crown finely dark-streaked rufous, pale pinkish to creamy-buff below with, at best, few sparse spots on flanks/thighs (especially female).

*F. b. feldeggii* (Italy east to Asia Minor and Azerbaijan) Darkest; dark grey-brown and well barred above, crown heavily dark-streaked deep rufous (occasionally fully streaked or even plain dark grey), flanks/trousers well barred.

*F. b. tanypterus* (Middle East and northeast Africa, west to eastern Libya, south to north Sudan) Paler brown-grey and less barred, crown more rufous-buff and finer-streaked, reduced barring on flanks/thighs.

*F. b. erlangeri* (northwest Africa east to central Libya, south to Mauritania and southern Sahara) Smallest and palest; light brownish-slate and barred above, crown creamy-buff with few or no streaks, even less patterned below than *tanypterus*.

*F. b. abyssinicus* (tropical sub-Saharan Africa, from Senegambia east to Ethiopia and Somalia, south to north Kenya) Darker brownish-slate above, crown dark chestnut, more spotted and barred below.

This and Lagger Falcon (304) form a superspecies, which sometimes considered also to include some or all of Prairie, Saker, Altai and Gyr Falcons (305, 306–308), though those all differ in various aspects of biology.

**MEASUREMENTS** *F. b. biarmicus* ♂ wing 308–332 mm,

♀ 340–360 mm; ♂ tail 160–178 mm, ♀ 185–210 mm; ♂ tarsus 46–55 mm, ♀ 45–52 mm. *F. b. feldeggii* ♂ wing 306–323 mm, ♀ 326–368 mm; ♂ tail 168–170 mm (two), ♀ 175–202 mm (nine); ♂ tarsus 50–52 mm (two), ♀ 53–56 mm (seven). *F. b. tanypterus* ♂ wing 308–342 mm, ♀ 355–375 mm; ♂ tail 149–182 mm, ♀ 186–207 mm; ♂ tarsus 49–55 mm, ♀ 52–57 mm. *F. b. erlangeri* ♂ wing 305–324 mm, ♀ 338–359 mm; ♂ tail 156–166 mm (five), ♀ 172–187 mm (six). *F. b. abyssinicus* ♂ wing 318–333 mm, ♀ 353–387 mm. **Weights** *F. b. biarmicus* unsexed 430–910 g (♂ probably below 600 g, ♀ over 600 g); ♂ of pair 528 g, ♀ 756 g. *F. b. feldeggii* ♂ 500–600 g, ♀ 700–900 g.

**REFERENCES** Beaman & Madge (1998), Bergier (1987), Bijleveld (1974), Bonora & Chiavetta (1975), Brown & Cooper

(1987), Brown *et al.* (1982), Cade (1982), Ciacco *et al.* (1987), Craib (1977, 1981), Cramp & Simmons (1980), Dalling (1975), Flint *et al.* (1984), Gandlett & Millington (1992), Genschel (1986, 1995), Glutz von Blotzheim *et al.* (1971), Goodman & Haynes (1989, 1992), Hagemeyer & Blair (1997), Handrinos & Akriosis (1997), Handrinos & Demetropoulos (1983), Hollom *et al.* (1988), Janz (1960), Kemp (1972, 1975, 1989), Leonardi (1994), Leonardi *et al.* (1992), Livertsidge (1984), Manri & Perna (1994), Massa *et al.* (1991), McGowan & Massa (1990), Mendelsohn (1988b), Osborne & Colebrook-Robjent (1984), Potter *et al.* (1981, 1996), Shirihai (1996), Shirihai *et al.* (1996, 1998), Sinclair & Walters (1976), Smeenk (1974), Steyn (1982), Swenson *et al.* (1990), Tarboton & Allan (1984), Tarboton *et al.* (1987), van Zyl (1991), Yosef (1991), Zimmerman *et al.* (1986).

## 306 SAKER FALCON

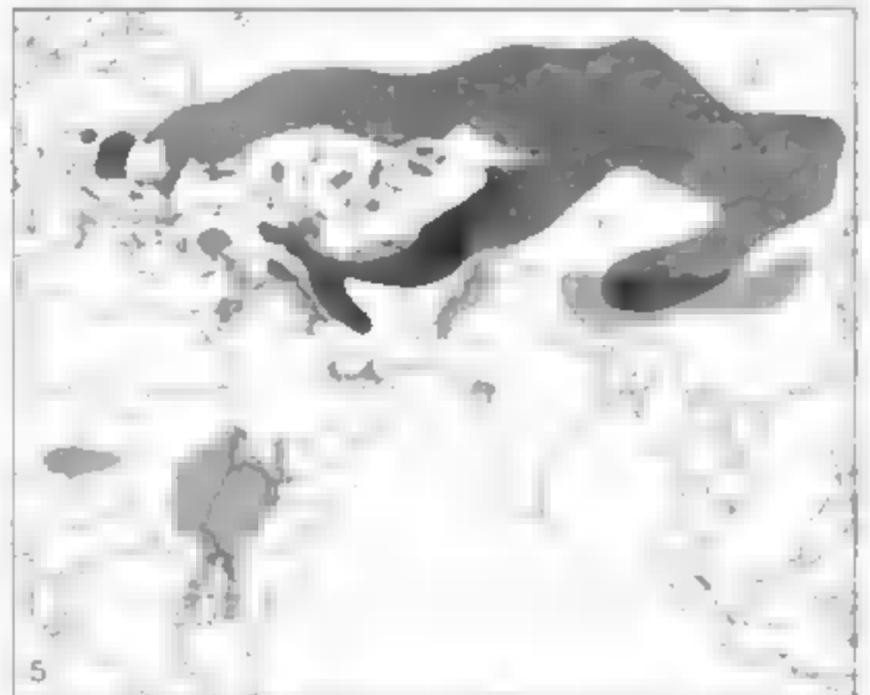
*Falco cherrug* JE Gray, 1834

Plate 108

Other names: Saker, Common Saker (nominate), Siberian Saker or Shangar (*subspes.* 'virescoides')

**DISTRIBUTION** Palearctic and, in winter, also Afrotropical and marginally Indomalayan (56°N to 28°N, winter to 21°S in India and to 3–4°S in Africa); order 5; though possibly quite common locally in east, uncommon to scarce or rare throughout most of range (rare also in all non-breeding areas) and, except for local increases where protected, probably declining in general. Breeds central and eastern Europe, eastward across central Asia (overlap with similar Lanner [305] restricted largely to winter and passage periods): north Germany (Saxonia, first bred 1997), northeast Austria (recolonised), southeast Czech Republic, Slovakia, Hungary, northeast Croatia and northern parts of former Yugoslavia, east through Bulgaria, Romania, Moldova, then east and northeast through Ukraine and across to south Urals and southern Russia (south to north Turkmeniya) and Kazakhstan, on through southern Siberia (north to upper Yenisey) and north and east Mongolia to southern Transbaikalia, and, in south, from west-central and east Turkey, north Iraq, north and west Iran (south along Zagros range) and northernmost Afghanistan, through Kirghizia and across northern China (Sinkiang, Gansu, Qinghai, Inner Mongolia, western Heilongjiang).

**MOVEMENTS** Various resident, migratory and nomadic, though juveniles everywhere mainly or, probably, entirely migratory. Adults frequently resident in central Europe, but elsewhere in west many, perhaps majority, move down into Mediterranean region (mostly from Italy eastward), while further east and across central Asia, though some pairs resident even in north, virtually entire population except southernmost leaves breeding areas in September–October to winter in Middle East, northeast Africa south to Kenya (fewer than ten confirmed records, most in Rift Valley) and northernmost Tanzania (only two records), with few west to Tunisia, and in and south of southern parts of Asian breeding range, there extending down to Pakistan (both races, mostly nominate, mainly northwest and Baluchistan), northwest India (mainly Gujarat; only one record Himachal Pradesh, 1996), Nepal and across



central China. Passage recorded in Middle East mid September–November, with return mid February–April (stragglers to as late as mid May), and present in all wintering areas mostly October–March. Some longer movements along east-west axis indicated by European juveniles recorded as far east as Pakistan and northwest India, while eastern *subspes.* winter west to Iran and claimed in Armenia and Middle East. Vagrants occasionally recorded in western Europe north to Sweden, west in northwest Africa to Morocco, and, in Asia, south to Hong Kong.

**HABITAT** Typically, open dry country with cliffs or scattered tall trees, or even merely electricity pylons, and in breeding season generally with good supply of small rodents (see Food); especially favours forest-steppe, steppe, subdesert, plains and grassland, locally also riparian forest and occasionally more heavily forested areas (but always bordering or close to open areas for hunting), often in remote hilly areas or in foothills, and even to higher bare slopes in eastern range, where shows preference for upland plateaux and mountains with cliffs and canyons; forages out over open areas of similar nature, but also pasture and cultivated fields (e.g. in Europe), and wetlands, sometimes flying up to 20 km or so from nest site. In winter uses wide variety of similarly open habitats, from grassland to

ests on electricity poles and pylons, while in Volga delta region Sakers started to use rookeries for nesting. Even though productivity often high, with sometimes five young reared from single breeding attempt, many nests seem to be preyed on by Eurasian Eagle Owls *Bubo bubo* (normally clear out entire brood), while shooting and the destruction of nests persist, especially in Asia. As species is so highly prized by falconers, however, capturing of adults and robbing nests of chicks remain major problems everywhere, even in areas where such activities outlawed: in Middle East, where falconry widely practised, mostly in Arabia, some 2,000 birds (majority juveniles) quoted as caught annually on migration or in winter, and other sources allege that over 2,500 captives (most/all females) are being trained there in any one year, while hundreds of migrants are regularly caught and smuggled out of China by Arabs (these figures surprisingly high in view of this falcon's apparent rarity on passage, or perhaps a major reason for that). Such excessive pressures, combined with others factors mentioned above, give cause for concern over this species' ability to maintain numbers, let alone expand. Chinese initiative of controlled export quotas only partially successful, and illegal smuggling still a problem.

**GEOGRAPHICAL VARIATION** Although plumage tends to become paler eastward, palest individuals in east matched by some in west while darker birds also found in east, and individual variation not inconsiderable throughout range: furthermore, 'sacemides' variant (more grey-brown or largely greyish above and barred, especially on lower back to uppertail-coverts, fewer rufous edgings, tail-bars more complete, crown occasionally rufous, flanks variably barred, wing-linings whiter and often barred), sometimes treated as subspecies, apparently no more than intergrade between western and eastern populations where these meet in south-central Siberia (see Dementiev & Gladkov), but individuals more or less identical to this also recorded rarely in west of range (aberrant birds?, migrants?). True situation thus rather obscured, and recognition by some

authors of up to six races (e.g. western *cyanopus*, eastern *progressus*) considered unwarranted. Here treated as two intergrading races.

***F. c. cherrug*** (Europe and Iran eastward to south-central Siberia; winters southeast Europe, East Africa east to northwest India) Mostly rufous-edged brown above and unbarred, head pale and streaked, spotted and streaked below.

***F. c. milvipes*** (south-central Siberia south to west China, east to northeast China; winters south to Iran, northwest India, central China) Dark-barred rufous to orange-buff above, more completely barred tail, barred wings, ground colour of crown and nape often pinkish-rufous, flanks barred.

While Saker formerly considered, together with Altai and Gyr Falcons [307, 308], to form a superspecies with Laggar and Lanner [304, 305], allopatry is incomplete and its morphology and ecology probably too distinct to warrant such treatment, though Saker certainly close to first two species. See also Altai Falcon.

**MEASUREMENTS** *F. c. cherrug* ♂ wing 336–372 mm, 375–423 mm; ♂ tail 186–208 mm, 207–235 mm; ♂ tarsus 50–57 mm, 54–61 mm. *F. c. milvipes* ♂ wing 340–380 mm, 374–435 mm; ♂ tail 188–236 mm; ♂ tarsus 50–60 mm. **Weights** *F. c. cherrug* ♂ 730–950 g, 970 g–1.3 kg. *F. c. milvipes* ♂ 750–990 g, 975 g–1.15 kg.

**REFERENCES** Amadon & Bull (1968), Bagytura *et al.* (1994a/b), Baumgart (1991b), Beaman & Madge (1998), Brown *et al.* (1982), Cheng Tzu-hsin (1987), Cramp & Simmons (1980), Dementiev & Gladkov (1951), Etchécopar & Hûe (1978), Flint & Sorokin (1994), Flint *et al.* (1984), Gantlett & Millington (1992), Gensbol (1986, 1993), Glutz von Blotzheim *et al.* (1971), Goodman *et al.* (1989), Hagemeyer & Blair (1997), Handrinos & Akriotis (1997), Handrinos & Demetropoulos (1983), Hollow *et al.* (1988), Inskipp & Inskipp (1991), Kemp & Crowe (1993), Knystautas (1993), Kustov (1980), Meyer de Schauensee (1984), Polushkin (1988), Porter *et al.* (1981, 1986), Richardson (1990), Riddle & Remple (1994), Roberts (1991), Rogacheva (1992), Shirihai (1996), Shirihai *et al.* (1996, 1998), Svensson *et al.* (1999), Zimmerman *et al.* (1996).

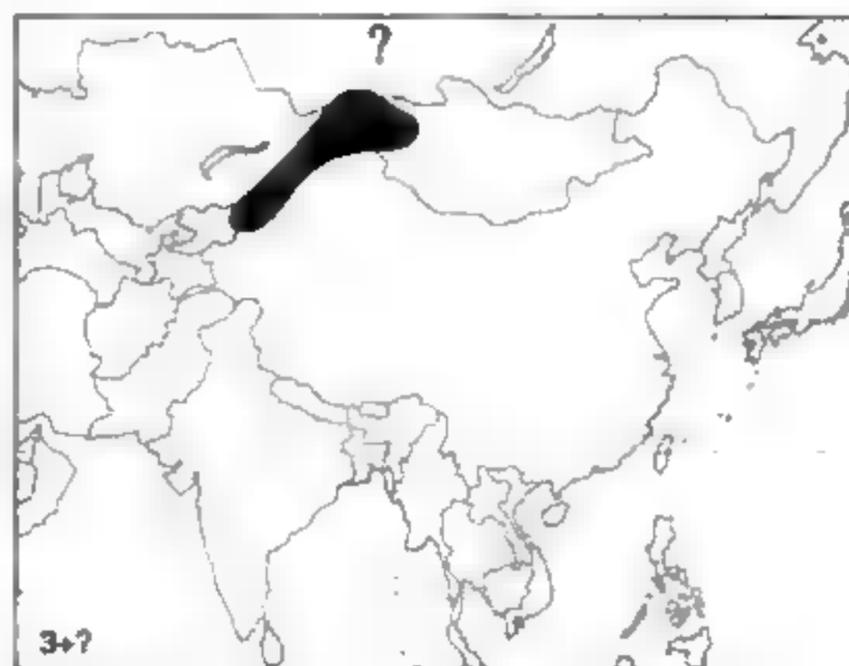
## 307 ALTAI FALCON

*Falco altaicus* (Menzbier, 1891)

Plate 108

**DISTRIBUTION** Palearctic (approximately 55°N to 41°N, winter to 3°N); order 3+?; very little known and apparently rare to very rare, though could prove to be commoner locally. Central Asia, where distributional limits uncertain and extent of overlap with closely similar Saker [306] (of which may be subspecies) unclear: known range encompasses mountains of southwest Siberia, northwest Mongolia and westernmost China (northwest and southwest Sinkiang), in Altai, Sayan, Hangayn and Tien Shan ranges, apparently extending into extreme east Kazakhstan in Tarbagatay mountains and into eastern Kirghizia in mountains north and south of Lake Issy-kul.

**MOVEMENTS** Some adults remain all year in breeding area, but otherwise dispersive and nomadic, some possibly wandering longer distances. In non-breeding



crudely constructed, 100 x 75 cm, and unlined but for prey remains, but surely old nest of another bird), all on cliff crag or in tree; same sites used for many years. Clutch 2–5. Incubation and fledging periods unrecorded, presumably similar to Saker.

**POPULATION** No data on densities or numbers, but clearly this is a very rare and extremely poorly known falcon: one source remarks that fewer than 100 individuals (specimens?) are known to zoologists. Even its exact breeding range is uncertain, and this, combined with possible confusion over its identification (see Field Characters) and taxonomy (see Geographical Variation), renders impossible any attempt at a realistic assessment of its population. Nevertheless, one could speculate that breeding area probably covers some 1.5–2 million km<sup>2</sup>, of which perhaps one-third or more might offer acceptable habitat, largely in remote regions as yet inadequately surveyed by ornithologists; species is evidently widely dispersed, and density of, say, 1 pair/2,000 km<sup>2</sup>, comparable with that of Gyr [308] in Alaska, would give population of 250–350 pairs. The extremely few published reports of this falcon, however, indicate that it is probably even scarcer than that, and one might guess at a total of no more than 200 pairs.

**GEOGRAPHICAL VARIATION** Monotypic, but dimorphic or even polymorphic (no information on relative proportions of each morph). Taxonomic status confused. First described from an adult male and its five nestlings, these showing several features (including

bluish cast to male's upperparts) to some extent intermediate between Saker and Gyr [306, 308], and this interpreted variously as indicative of hybridisation between those two (despite their widely separated breeding ranges!), or as evidence for regarding Altai as subspecies of one or the other or as full species. Now normally considered a subspecies or, more usually, no more than a colour morph of Saker or Gyr: shows structural and/or plumage similarities to both, but proportions perhaps closer to Gyr and may represent a disjunct population of that species, whose nearest breeding area lies c1,300 km to the north; but both typical Saker nestlings and dark Altai-like siblings found in nests in east Kazakhstan, while DNA analysis of one *altaicus*-type demonstrated that at least one of its parents (female) was Saker. Additional molecular testing of birds in breeding areas obviously desirable. Possible that Altai Falcon is, in fact, an incipient species. Treatment here as full species may help to raise awareness and promote active study of this interesting but little-known falcon and further research into its true status and relationships.

**MEASUREMENTS** ♂ wing 348–377 mm (19), ♀ 385–415 mm (33). **Weights** ♂ 800–850 g (three), ♀ 990 g–1.63 kg (seven).

**REFERENCES** Amadon & Bull (1988), Dementiev & Gladkov (1951), Flint *et al.* (1984), Khvostautas (1993), Rogacheva (1992), Stepanyan (1990c), Sushkin (1938).

## 308 GYR FALCON

*Falco rusticolus* Linnaeus, 1758

Plate 109

Other names: Gyr, Gyrfalcon, Jer Falcon, Iceland Falcon (pale grey morph), Greenland Falcon (white morph).

**DISTRIBUTION** Holarctic (82–83°N in New World, and 78°N in Old, to 60–65°N and probably in eastern Asia to 53–59°N, wintering south to 55–60°N and, more irregularly or locally, to 48°N in North America and 44°N in Asia); order 5; often uncommon to rare, but relatively numerous in parts of vast range. Circumpolar arctic America and Eurasia: Alaska, Canada (northwest British Columbia, Yukon, north Mackenzie, Keewatin, north Quebec, north Labrador, and various arctic islands north through Ellesmere), coastal Greenland (including parts of north), Iceland, Norway, northwest Sweden,

north Finland and north Russia right across northern Siberia to Chukotskiy peninsula (mainly north, or well north, of Arctic Circle but probably south into Kamchatka, as well as Beringa island in Komandorskiye Ostrova).

**MOVEMENTS** Adults typically sedentary, most markedly so in Iceland and Scandinavia, but some northernmost populations and other individuals migratory or nomadic, particularly if food short, while juveniles generally dispersive. Among west Alaskan juveniles marked with radio transmitters, one crossed to Anadyr in northeastern Siberia in its first month of independence, then back to Alaska and south to Kodiak Island



show large pale patch at bases depending on strength of mottling; white underparts usually least marked on throat (plain), chest (sparsely streaked) and smaller wing-coverts (speckled and streaked), often more heavily on lower breast and belly, and most strongly spotted and barred from flanks and axillaries along mid-wing band to primary coverts, in contrast to paler flight-feathers (primaries darker-tipped) and tail, which are unobtrusively barred pale and darker grey. **Dark-morph adult** Largely blackish-brown with solid hood and, below, pale greyish undersides to flight-feathers and pale-barréd tail giving two-tone effect in contrast to dark body and wing-linings; but, at closer ranges, pale markings on hindneck, obscure pale barring on back, rump and uppertail, variable whitish streaking on breast and barring on flanks and crissum may be apparent to varying extents; see previous section for dark-hooded intermediate. **White-morph juvenile** Usually looks much less white above than white adult, with more heavily streaked head, much more strongly marked back and wing-coverts (varying from white-edged brown to brown-streaked white), more extensively dark wing-tips and variably clearer barring on flight-feathers and tail; more similar below, apart from flight-feathers and tail, but underbody and wing-linings usually streaked and spotted with brown, sometimes quite densely, or occasionally almost plain, in which case more or less bluish-grey (not yellow) legs and cere may help distinction. **Grey-morph juvenile** Not unlike grey adult above, but usually darker head (similar face pattern apart from darker cheeks and bluish cere) and all much browner, with whitish-scaled back and wing-coverts (no barring), and thin buffish bars on tail; creamy underbody and wing-linings more or less heavily brown-streaked, contrasting, as on adult or more so, with pale-barréd brownish flight-feathers and tail. **Dark-morph juvenile** Even more solidly dark than dark adult, but similar two-tone underwings; any sparse pale streaks or other markings on crown, hindneck, tail and underbody rather obscure and visible only at close ranges.

**CONFUSION SPECIES** Adult and juvenile of white morph unmistakable, but beware of albino or very pale perched *buteos*, notably of Red-tailed Hawk [202] in North America and of Common Buzzard [203] in northern Europe (both similar in size, especially wingspan, but with different build, wing-tips nearer tail-tip when perched, often some retention of normal tail pattern); big-headed yellow-eyed Snowy Owl *Nyctea scandiaca* superficially similar only in colour. Other morphs need to be distinguished from Peregrine Falcon [309] (smaller, though largest females of northern races *tundrius* and *calidus* nearly as bulky-looking; wing-tips reach or nearly reach tip of shorter tail; faster, deeper beats in flight, when shorter and less tapered tail and relatively longer-looking – though shorter-armed – and more pointed wings are both narrower, and underwings uniformly dark-barréd, not two-toned) and from Northern Goshawk [153] (surprisingly comparable flight action, but proportionately shorter and broader wings with obvious curve of bulging secondaries – though at times similarly blunt-tipped – are more two-toned above, and proportionately longer tail broadly banded); compare descriptions and plates of both for plumage differences, but note that more hooded variants of Gyr

can recall Peregrine, particularly juveniles of northern races, and dark morph also resembles Peregrine's northeast Pacific coastal race *pealei*. Extralimital records, especially juveniles in all cases, may need comparison with mainly allopatric Prairie Falcon [303] in Nearctic (smaller, paler brown, distinctive head markings and underwing pattern) and normally totally allopatric Saker [306] in Palearctic (smaller head, slimmer body, narrower bases to more pointed wings and thinner tail, greater contrast above between paler and more uniform wing-coverts – easiest when tinged rufous – and dark flight-feathers without primary-patches, and below between darker wing-linings and paler flight-feathers, as well as subtle and more variable differences in patterns of head, tail and underbody, but see also adult of aberrant 'sacroides' variant).

**VOICE** Usually silent outside breeding area. Main territorial and mobbing call of both sexes, uttered also by male in high-circling and in floating descent (see Sociosexual Behaviour), is deep guttural *kak kak kak...* or hoarse rattling *keek keek keek...*, coarser and gruffer than Peregrine [309]. Other versions, more slowly or more rapidly repeated, with longer or shorter pauses, thus ranging from softer short *chuk* to extended chattering, used in various contexts, including wailing version in cyrie-flypasts. Also loud trilling *gii...*

**FOOD** Often almost entirely birds, but also mammals to sometimes considerable extents. Birds range in size from finches (Fringillidae) to geese and Capercaillie *Tetrao urogallus*, but Ptarmigan *Lagopus mutus* and Willow Grouse *L. lagopus* often chief prey in tundra, while auks, gulls and seabirds may predominate in coastal areas, and waders and ducks by wetlands; sometimes small passerines, especially Snow Buntings *Plectrophenax nivalis* and Lapland Longspurs *Calcarius lapponicus*, regularly taken. Mammals range from voles to hares, but arctic hares *Lepus arcticus* and, in peak years, lemmings (especially *Lemmus lemmus*) most significant, while in Alaska ground squirrels *Spermophilus* can make up half of all food. Often watches for prey from low or high perch, then attacks in ground-hugging flight, finally rising slightly for short stoop or, if that unsuccessful, frequently continuing with tail-chase, occasionally up to several kilometres. Also forages in fast direct flight at 5–20 m to flush prey – sometimes, especially in winter, hovering over patches of scrub – or searches much higher up, at 150–300 m, either in soaring circles or to-and-fro quartering. Once flushed, Short-eared Owls *Asio flammeus*, jaegers/skuas *Stenomarius* and other light wing-loaders with superior manoeuvrability may be forced to stay up until exhausted. Birds are usually knocked down, rather than snatched, and most prey is taken on ground or water.

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs; small groups of 6–8 on passage probably juveniles. Aerial displays include: single and mutual high-circling; lateral rolls, which may be combined with 2–3 steep dives and climbs of 30–50 m; floating shallow descent with half-closed wings held slightly up, tail spread and legs lowered; figures-of-eight by male past cyrie; and various chases and mock-attacks, including presenting talons.

**BREEDING** Late April–August. Scrape on overhung cliff

like Merlin [294] or even more, to use Old World comparison, like Northern Hobby [295]). In Palearctic, however, several other species need to be considered, especially juveniles in comparison with bulkier, paler-headed and thinner-moustached migrant *calidus*: Lanner, Saker and Altai Falcons [305-307] (all averaging slightly to clearly larger, though big female Peregrines larger than many males of the other three; wing-tips short of tip of proportionally longer tail; shallower beats of rounder-tipped wings; adults distinguished by head pattern, paler or streaked or blotched underbody) and, in North and Saharan Africa and Arabia to central Asia, Barbary Falcon [310] (only slightly smaller than *brookeri*; adult clearly paler above with different head pattern and extensive rufous, pinkish-buff below with much less and more broken barring; juvenile less hooded, more creamy-rufous below with thinner streaking, and apparently acquires yellow cere and orbital rings much earlier). In Afrotropical region proper, Lanner is commonest and most widespread large falcon, while Saker and Barbary are only scarce visitors to East Africa; see also Teita Falcon [312] (Peregrine-shaped but smaller, darker, with rufous on nape and almost plain or lightly streaked underbody and wing-linings). In Madagascar, Eleonora's and Sooty Falcons (see opening sentence above) are only possible confusions, both far commoner than Peregrines during northern winter. In Indian area, Saker and Barbary Falcons again need to be taken into account (only north and northwest respectively) and Laggar [304] comes into picture in Pakistan and much of India to Burma (longer-tailed again; rather uniformly dark brown above with paler head, thin moustaches, often whitish supercilia; white throat and often breast, more or less heavily streaked abdomen, two-toned underwings). There and elsewhere in Indomalayan region, adults of the dark-looking and more extensively black-headed breeding races of Peregrine (black-and-rufous *peregrinator*, black-and-grey *ernesti*) are not difficult to separate from migrant *japonensis*, and juveniles are more rufous in ground colour below. In Australia, pale adult Peregrine could be confused on bulk alone with Grey Falcon [300] (uniformly lighter and greyer above with no hood, and grey to white underbody and wing-linings; at most only very thin moustaches and light streaking below in juvenile); and juvenile Peregrine with Brown Falcon [274] (double cheek-stripe, longer and more rounded wings and tail, weaker flapping flight; glides and soars on raised wings). Finally, in sub-Saharan Africa, Madagascar and southeast Asia to New Guinea, unrelated Bat-hawk [22] may be confused at dusk because of its similar size, falcon-like flight, broad-based wings and shortish tail (but has big head and eyes, wispy crest, small bill, deep slower beats, and is largely blackish as adult and brown-blotched white below as juvenile).

**VOICE** Usually silent away from breeding area, but often noisy near occupied eyrie; resident pairs may be vocal for anything up to two-thirds of year, from several weeks before laying to 3-4 months after fledging. Most familiar call, especially against human intruders and other potential threats, is loud, harsh persistent chatter, or 'cackling', higher-pitched in male, slightly slower and hoarser in female, commonly written as *kak-kuk-kak...* (or as repetitions of *kek*, *hek*, *hak*, *kark*, *kuark*, etc) and

varying in quality in different circumstances from rapid cackle to accelerating scream. With rising intensity, this may be preceded or, more often, followed by shrill 'wailing-call', *kee-arrk* or more drawn-out *kee-aa-arrk*, which with such variants as *kee-chup* and repeated *chirrup* is also used on its own in territorial and food disputes and by adults and large young in various connections with food, feeding and contact. Aerial displays sometimes silent, but often vocal; main utterance then, and in greeting and courtship on cliff face, is 'creaking-call', usually disyllabic *ee-chip* (male) or *ee-chup* (female), sometimes with extra syllable at beginning or just second note alone, singly or, more often, repeated in short series, sometimes in continuous fast chatter.

**FOOD** Almost entirely birds; sometimes local or individual specialisation on mammals, notably rabbits, hares, lemmings, voles, bats; occasionally amphibians, lizards, insects; exceptionally fish and carrion. Several hundred bird species recorded - perhaps 1,000+ worldwide - ranging from less than 10 g to over 5 kg, from kinglets *Regulus*, other small warblers and tits *Parus* to divers (loons) *Gavia* and larger geese *Anser* and grouse *Tetrao*, also other raptors and predators, such as barn-owls and 'true' owls, skuas (Stercorariidae) and, rarely, other Peregrines. But, with females of all races (650 g-1.6 kg) averaging 40-70% heavier than males (450 g-1 kg), and smallest females usually bigger, stronger and less agile than largest males, there is considerable sexual difference in prey taken, yet much overlap in what is predominant. Both are capable of carrying nearly their own weight, but most prey in range 25-350 g (males probably seldom more than 300 g, females not often less than 100 g). Main prey varies in different parts of world, and between inland and coastal habitats, but commonest are ducks, gamebirds, coots and gallinules (Rallidae), waders, auks and gulls and other seabirds, parrots, larks, thrushes, American blackbirds (Icteridae), Common Starlings *Sturnus vulgaris*, crows and, above all, pigeons and doves, especially feral and other descendants of Rock Pigeons *Columba livia*. Many are social or flocking species; some have conspicuous plumage or song-flights. Usually still-hunts from cliff pinnacle or other high open perch, or watches while circling or soaring ('waiting on'). Almost all prey killed in flight, typically after manoeuvring above, when necessary climbing with rapid wingbeats or 'innocently' circling upwards in wide spirals, selecting target if in flock, and diving in rapid stoop, which may be quite short or for several hundred spectacular metres, normally at 30-45°, but sometimes shallower or seemingly almost vertical, and at speeds variously estimated at 160-440 km/h (affected by angle and distance, but probably seldom more than 250 km/h and theoretically unlikely to exceed 384 km/h). May grasp ('bind to') smaller prey, but mostly strikes with loosely bunched toes and rakes with hindclaw; may then catch dead or wounded victim as it falls or, more often, follows it down to ground. High proportion of stoops unsuccessful and, having missed, often uses impetus to swing up ('throw up') and repeat; or may stoop past, throw up and, rolling over, strike target from below. Tail-chasing also common, especially when prey tired or injured, and then often strikes or binds from below. Occasionally, quarters slowly to flush birds or take

ground prey, low like harrier or at up to 100 m, or applies similar technique to forest canopy. Landbirds flying over lakes may be forced down into water by series of short stoops, while seabirds are regularly hunted by surface-hugging flight and, if missed, repeatedly forced to dive until exhausted, but in general most Peregrines prefer to strike over land. Crepuscular and even nocturnal foraging recorded. Pairs often hunt co-operatively.



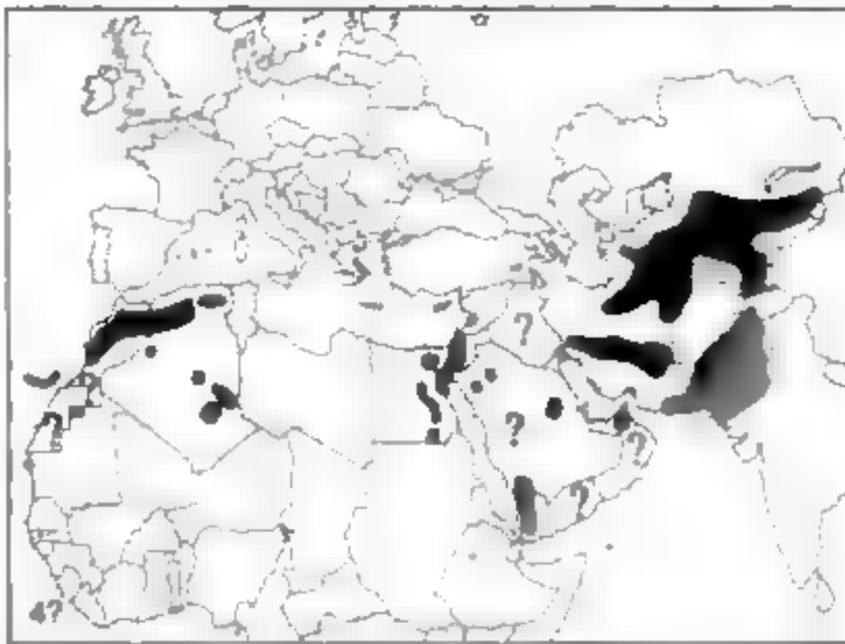
**Fig. 59.** Start of stoop by a Peregrine Falcon *Falco peregrinus* [309] as it selects its target. The dive may be quite short or continue for several hundred metres, usually at angles of 30–45° but sometimes almost vertical, and generally at 160–250 km/h (see text concerning higher estimates).

**SOCIOSEXUAL BEHAVIOUR** Solitary or in pairs; usually singly also on migration and when roosting, but up to 11 recorded harrying wintering ducks in India, rarely several together on migration and, in Isle of Man, regular communal roost of up to nine (variably with Northern Sparrowhawks [145], Common Kestrels [277] and occasionally Merlins [294], also Common Ravens *Corvus corax*). Spectacular aerial displays include single and mutual high-circling, shallow or steep undulating flights which may develop into full rollercoaster with lateral lifts or rolls, or looping-the-loop on more or less closed or rapidly flapping wings; in 'Z version', from horizontal flight, bird suddenly wings over on one side, dives diagonally in opposite direction and then levels off back again, this sometimes preceded and followed by slow exaggerated flapping flight. Figures-of-eight by male on horizontal plane in front of eye. Mutual high-circling may lead to variety of flight-play, including long dives ('stoops': see Food) and other mock-attacks, presenting talons or grasping feet, and other momentary contacts such as touching breasts or bills.

**BREEDING** Season may depend on weather (including timing of tropical rains) and availability of bird prey: May/June–August in high Arctic, February/March–June in north temperate regions, very variously June–February in tropics, and July/August–January in south temperate. Typically, scrape on broad bare ledge, or in old nest of corvid, other raptor, or seabird, mostly at

10–200 m on sheer cliff; very locally, substitute sites on urban skyscrapers, cathedrals, tall chimney stacks, isolated or coastal towers, pylons, silos and major river bridges adopted in various parts of world, sometimes for years in succession. Old tree-nests of other birds commonly used in central and eastern Europe, and also in Australia, where large tree hollows another regular site. In tundra, and other areas without suitable crags or high alternatives, scrape may be on river bank or low man-made structure, such as ruined stone building or earthed roof of old hut, or even on mound or sand-dune; no material added, though debris may be rearranged. Clutch 3–4 (1–6). Incubation 29–33 days. Fledging 35–42 days; independent after further 6–15 weeks.

**POPULATION** On conservative estimate, breeding range scattered over 54 million km<sup>2</sup> (40% of world's landmass excluding Antarctica); any of perhaps another 9 million km<sup>2</sup> may be visited during northern winters, especially by three highly migratory arctic races (*tundrius*, *calidus*, *japonensis*). With so vast a breeding range – more than twice that of Osprey [8], the only other raptor of cosmopolitan occurrence, though still less than Black Kite [39] of Old World alone – this might be expected to be one of the commonest birds of prey. But that is far from so, even now that there has been considerable recovery in parts of northern hemisphere from pesticide troughs of 1950s–70s. Cade put early 1980s population at 12,000–18,000 pairs, including 1,600–3,050 in Europe, 2,846–3,862 in North America, and 3,000–5,000 in Australia; European Russia, northern Asia and northwest Africa probably also held four-figure totals, but sub-Saharan Africa and South America perhaps only low hundreds. Despite subsequent increases, quite marked in some regions, total number of birds unlikely yet to exceed five figures. In Britain, c800 pairs in 1930s was reduced to under 500 in 1940s (wartime shooting), recovered to 650–750 in mid 1950s, dropped to 430–450 in 1960s and early 1970s (pesticides), then more than recovered again to 1,100 by 1991, with highest recorded density of 8 pairs in one 10 km square (1 pair/12.5 km<sup>2</sup>); yet southeast England (where Sussex held up to 12 pairs along 19 km of coast until 1950s) only started to be recolonised in the 1990s. By then, too, Ireland's 365 pairs was three times as many as in 1960s nadir, and both these populations may now be at their highest ever. On the other hand, the early 1990s population of European Russia had apparently dropped to about 700 pairs, including only 20–25 in 14,000 km<sup>2</sup> in the northeast (1 pair/360–700 km<sup>2</sup>), and those elsewhere in Europe had earlier fallen so low that even subsequent increases of 50–100% had still not brought them anywhere near their 1950s levels. Apart from Britain and Ireland, only other European countries with totals now put at hundreds or higher are Spain (2,000 pairs?), France, Switzerland, Germany, Italy, Greece and Russia. In North America pesticide effects were even worse, including extinction in eastern USA and southeast Canada. Some recovery has been helped there and elsewhere worldwide by releasing captive-bred birds; up to 1950 there were only two records of Peregrines breeding in captivity, but this is now commonplace and several thousand have been hacked back to the wild. Two long-studied Alaskan populations dropped 25% and 66% in the pesticide era, but by 1990s had recovered to



central Asia), but juveniles and other non-breeders generally dispersive and even partially migratory. Southern limits of breeding range imperfectly known, but presumed migrants recorded south in Africa to Mauretania, Mali, Niger, Chad, Sudan, northern Kenya, Eritrea and northern Somalia, as well as southern Arabia, Iraq and southern Iran; more regular and less uncommon winter visitor to Pakistan and northwest India. Little recorded on migration: 10–20 annually on passage during both seasons at Eilat, but juveniles and immatures wander into north and west Israel, also reaching Syria, and similarly disperse in northwest Africa, where have been recorded on Mediterranean coast.

**HABITAT** Typically, inland deserts and other mainly barren arid areas, especially with wide deep wadis, gorges or rocky foothills, but breeds locally on coastal and riverside cliffs in Morocco and Egypt; 'inhabits also mountain forest in regions with a good rainfall' (Vaurie). Winter visitors in Pakistan and northwest India tend to settle in dry country, such as semi-desert with scattered scrub and trees, but both they and desert residents will also forage over cultivation and river valleys, and around oases and human settlements. Mostly 250 m to 1,000 m, but locally down to sea-level, as well as up to 2,000 m in Afghanistan and perhaps even higher in central Asia.

**FIELD CHARACTERS** Medium-sized to largish falcon, similar in structure to Peregrine [309], including solid-looking head and neck, but relatively slim, not so broad-headed or deep-chested and, as adult, more or less rufous-buff on forehead, supercilia and nape and otherwise pale and obscurely marked; has narrow moustaches, large pale cheek-patches, long wings and short squared tail. Perches quite upright and openly on cliffs or rocks, sometimes on trees, telegraph poles, posts, buildings; wing-tips almost reach tail-tip. Sexes similar, but females average 11–13% larger (extremes to 28%) and evidently over 75% heavier (few data); juvenile quite distinct; as adult after first moult, which begins December–March and, especially if breeding in first summer, may not be completed until November.

**PERCHED Adult** Mainly pale blue-grey above with thin dusky spots, broadly blackish-banded tail and contrastingly dark primaries, but forehead, sides of crown (or at least supercilia) and, especially, whole nape variably rufous-buff to bright rufous, often continuing up on to rear crown but always leaving brown central cap; dusky areas around eyes extend down into thin moustaches

and back as even thinner eye-stripes, together outlining large squarish creamy cheek-patches; throat whiter, but otherwise cream to cinnamon or orange-buff below, usually plain on breast, lightly spotted or streaked with blackish on belly, and thinly barred or arrow-marked on flanks, thighs and crissum (underparts vary regionally and individually from almost plain to quite extensively, but always thinly, barred). **Juvenile** Beware that often very like juvenile Peregrine [309], especially race *brookei* of north Africa and south Europe to northeast Iran (yet also, in other ways, resembling highly migratory arctic race *calidus* see Confusion Species). Typically, but not invariably, slightly paler brown above than *brookei*, with marginally broader rufous fringes, more contrasting darker mantle, often darker-looking and more thinly rufous-banded tail and, in particular, less complete hood because of more obvious rufous-buff forehead and more rufous nape, usually joined by distinct pale supercilia above blackish eye-stripes, as well as larger and plainer cream cheek-patches behind thinner moustaches (which, except for rufous tones, are all also features of juvenile *calidus*); cream to rufous-buff underbody, below white throat, much more neatly and finely dark-streaked, giving impression of long lines instead of heavy streaks and obvious barred flanks. **Bare parts** Eyes dark brown. Adult cere and eye-rings yellow to orange-yellow, juvenile yellowish to pale yellow. Adult legs yellow to orange-yellow; juvenile pale yellow, becoming bright yellow by first spring.

**FLIGHT** Medium-sized to largish falcon, pale bluish above and thinly marked below as rufous-headed adult, comparable in shape to Peregrine [309], but relatively more lightly built with less obviously broad head and arms, long narrow-pointed hands, and short, wide square-tipped tail (which looks slightly longer because of narrower wings); wingspan 2.3 times total length. Flight actions like Peregrine, including gliding and soaring on flat or slightly depressed wings, but beats noticeably faster, particularly in pursuit of prey, when characterised also by sudden changes in direction; rarely, if ever, hovers. **Adult** Light bluish-grey above, palest on broad-looking rump (lower back to tail-base), with contrasting darker hands and blackish distal tail-bands, and distinctive head pattern including buff or rufous-buff forehead, more strongly rufous nape and (usually) supercilia, and thin dusky moustaches in front of large creamy cheek-patches; thinness of moustaches also obvious from below either side of white throat; rather variable underparts otherwise cream to cinnamon or orange-buff, often plain on breast and generally looking very pale, despite having, most typically, thin dusky bars on flanks and crissum, spots or streaks on belly, lighter greyer bars on wing-linings (darkest and strongest on greater primary coverts), and thinly barred buffish inner primaries, secondaries and basal tail (showing up dusky wing-tips and bold distal tail-bands). **Juvenile** Very like some juvenile Peregrines [309] (see previous paragraph), and often hard or impossible to separate in field, but more distinctive features mirror adult's: usually rather complicated head pattern of rufous-buff forehead and supercilia and rufous nape combining with large pale cheek-patches to show up blackish eye-stripes and thin moustaches; otherwise rufous-tinged brown above, apart from darker mantle,

over some 12,000 km from Canaries to Mongolia. Cade guessed that the breeding populations of both races number several hundred pairs each. The 1980s figure for Israel alone was c100 pairs in around 5,600 km<sup>2</sup>, giving rough average of 1 pair/56 km<sup>2</sup> (highest density of six pairs at 1 pair/30 km<sup>2</sup>) in an area that represents, at most, 5–10% of the distribution of the nominate race; also, 53 pairs were located in Tunisia in 1975. If the eastern race has comparable numbers, the world total of birds could be well into the four-figure range, perhaps even in the upper half, though in the 1960s the whole central Asiatic population was put at only 35–50 pairs (Stepanyan).

**GEOGRAPHICAL VARIATION** Two races.

*F. p. peregrinoides* (northern Africa, Middle East, Arabian Peninsula) Averages smaller; slightly darker blue-grey above, less rufous on head, blacker spotting on mantle and shoulders; more extensively marked below (see Field Characters).

*F. p. babylonicus* (Iran to northwest Indian region and west Mongolia) Averages larger; paler blue-grey above, more contrastingly rufous on forehead and nape, moustaches even narrower; paler and more rufous-tinged below, sometimes marked only on flanks, thighs and wing-linings.

These two rather distinct taxa are geographically isolated and the possibility of their being separate species has been suggested, but is unjustified on present knowledge. Conversely, both are often considered races of Peregrine Falcon [309], but proportions and build differ to some extent, plumage is distinctly paler and more rufous, and there is now good evidence of

sympatry in Morocco, northeast Iran (Khorasan), northwest Indian region and central Asia. The large falcon of Cape Verde Islands, *madens*, also confuses the issue: although usually treated as race of Peregrine, it has strong rufous and brown wash on crown, nape and upper mantle (all rather browner on female), thus approaching Barbary in some characters, but it is clearly larger, bulkier and darker than latter.

**MEASUREMENTS** *F. p. peregrinoides* ♂ wing 259–285 mm, ♀ 282–332 mm; ♂ tail 118–131 mm, ♀ 139–156 mm; ♂ tarsus 42–45 mm, ♀ 49–53 mm. *F. p. babylonicus* ♂ wing 273–310 mm, ♀ 313–348 mm; ♂ tail 126–135 mm, ♀ 151–158 mm; ♂ tarsus 45–46 mm, ♀ 53–55 mm. **Weights** *F. p. peregrinoides* ♂ 609–610 (2), *F. p. babylonicus* ♂ 330–398 g, ♀ 513–765 g (one 850 g and one 930 g possibly misidentified).

**REFERENCES** Ali & Ripley (1978), Allouze (1953), Archer & Godman (1937), Bailey (1966), Bannerman (1963), Baumgart (1989a/b/c), Beaman & Madge (1998), Brosset (1986), Brown *et al.* (1982), Bundy (1976), Cade (1982), Cave & Macdonald (1955), Clark & Schmitt (1999), Clark & Shirihai (1995), Cramp & Simmons (1980), Dementiev (1957), Dementiev & Gladkov (1951), Dementiev & Iljitshev (1961), Erard (1970), Etchécopar & Hûe (1967), Fischer (1967), Flint (1978), Flint *et al.* (1984), Foraman (1999), Gantlett & Millington (1992), Gensbol (1986, 1995), George (1970), Godman *et al.* (1989), Grimmett *et al.* (1998), Heim de Balsac & Mayaud (1962), Lovegrove (1971), Meinertzhagen (1954), Moore & Bowell (1956), Mullarney *et al.* (1990), Owre & Paulson (1968), Porter *et al.* (1981, 1986), Ratcliffe (1980, 1993), Roberts (1991), Selater & Mackworth-Praed (1919), Shirihai (1996), Shirihai *et al.* (1996, 1998), Smith (1965), Stepanyan (1969a/b), Thomsen (1989), Urban & Brown (1971), Valverde (1957), Vaurie (1961, 1965), Zimmerman *et al.* (1986).

**311 ORANGE-BREASTED FALCON**  
*Falco deiroleucus* Temminck, 1825

Plate 105

**DISTRIBUTION** Neotropical (18°N to 28°S); order 4; despite extensive range, rare to uncommon and local almost everywhere; some reports relate to misidentifications of Bat Falcons [299]. Central America (generally



rare and largely confined to Caribbean slope) and mainly tropical South America: Mexico (southeast Veracruz to south Campeche, possibly Chiapas), Belize, north Guatemala (at least formerly also on Pacific slope) and north Honduras; probably extinct Nicaragua and Costa Rica, barely recorded Panama; very patchy in north and east Colombia and northwest and southeast Venezuela, perhaps more widespread in Guianas; then south in east Ecuador (not common), east Peru, north and east Bolivia (Beni, Cochabamba, Santa Cruz), and perhaps much of Brazil (south to Mato Grosso, Rio Grande do Sul) into Paraguay and north Argentina (south to Salta, Chaco, north Corrientes); long thought absent from central Amazon basin, but recent records there of both adults and juveniles.

**MOVEMENTS** Generally considered sedentary, but has been found in Trinidad and, throughout range, occasional reports away from established breeding areas and suitable habitat must involve either wanderers or misidentified Bat Falcons.

**HABITAT** Mostly humid lowland and premontane tropical and subtropical forest, but in south also dry thorn-scrub and arid woodland of Paraguayan-Argentine chaco, in both cases chiefly where broken by cliffs or

other rock outcrops, or at least rising ground, or by rivers or other major openings, including galleries adjacent to savannah: occurs around clearings in terra firme forest in Amazonia, but there, as well as in French Guiana and Peru, appears to prefer forested river edges. Sea-level to at least 2,400 m, but much of range below 1,200 m.

**FIELD CHARACTERS** Medium-sized to largish powerful falcon, at distance looking all dark but for whitish throat and broad orange chest-band, with unusually heavy bill and big-looking head (male's chunkier, female's longer and thinner), fairly long wings, shortish tail, massive feet, long toes. Sometimes crepuscular when hunting; perches conspicuously on high bare branch or crag; wing-tips reach or often (mainly females?) project beyond tail-tip. Sexes similar in plumage, but female clearly bigger, averaging 14% larger (7-25%) and massive 74% heavier (53-98%); juvenile broadly similar, but quite distinguishable.

**PERCHED Adult** Dull black head (to cheeks) and quills, tail with three to four thin whitish bars and tip; otherwise all blackish-slate above with blue-grey edges (in bright light upperwing-coverts can look all blue-grey); throat clean white, neck-sides washed cinnamon-rufous, shading into orange-rufous at rear of part-collar and in broad band across chest, although rufous/orange sometimes replaced by apricot and chest then also black-streaked (South America; see Geographical Variation); dark waistcoat formed by black flanks and lower breast with coarse whitish to cinnamon wavy barring; thighs, belly and crissum rufous, with some (often indistinct) black barring on undertail-coverts. **Juvenile** Browner-black above, thin buff edges in fresh plumage; whitish throat, more streaks on paler rufous or sometimes whitish-buff chest, and waistcoat less clearly defined because black bars and spots extend as dark arrowheads over tawny-buff to cinnamon thighs, belly and crissum. **Bare parts** Eyes dark brown. Adult cere and orbital rings yellow, rarely tinged greenish (but in South America can be dull yellow-green to pale green); juvenile greenish-yellow. Adult legs yellow, juvenile paler.

**FLIGHT** Mid-sized to largish thickset falcon with longish broad-based wings, shortish rather broad-based tail rounded or slightly graduated at tip; wingspan 2.1 times total length. Fast powerful beats in pursuit, slower and shallower when cruising; glides and soars on flat wings. **Adult** All dark above, but for obscure whitish bars on tail, thin white tips to tail-feathers and secondaries, and white to orange-rufous on neck-sides forming lateral collar behind black head; below, white throat and broad orange chest-band stand out as large pale area against coarsely light-banded black waistcoat and underwings; rufous of thighs, lower abdomen and black-banded crissum shows at closer ranges. (In South America, rufous/orange of neck-sides and chest sometimes replaced by apricot; see Geographical Variation.) **Juvenile** Browner above; whitish throat and pale orange-rufous or buff of chest again conspicuous, even though latter more black-streaked, because underwings much as adult and rest of underbody predominantly dark or dark-banded; waistcoat effect not obvious, with black bars and spots extending over thighs and lower abdomen.

**CONFUSION SPECIES** Far commoner Bat Falcon [299] often misidentified but is smaller (beware insignificant size difference between biggest female Bat and

smallest male Orange-breasted), with less massive head and clearly smaller bill and feet, although judging size of lone bird (and especially of its feet) in field far from easy and, while juvenile Orange-breasted distinctive enough (tawny-buff to cinnamon thighs, belly and crissum all heavily black-banded/spotted), adults easily confused with Bat of any age: latter has more extensive black waistcoat on which finer and straighter pale barring hard to see at distance (so waistcoat can look solidly black, whereas Orange-breasted's more broadly scalloped pattern often noticeable at range); in Central America, blackish head contrasts with typically bluer upperparts and, although most show whitish throat with orange/buff wash on neck-sides and chest, those with brightest orange chest usually have buff-washed throat (good view needed); while South American (and some Central American) Bat Falcons blacker above, like Orange-breasted, they, too, normally have buffish (rather than clean white) throat. Observers with good experience of both species may find subtle differences in flight silhouettes a useful guide: Bat's less bulky head and its proportionately less broad-based wings and longer tail with squared (not rounded or graduated) tip more reminiscent of Merlin [294], whereas Orange-breasted rather suggestive of Peregrine Falcon [309] (see also that species). Otherwise, larger Aplomado Falcon [295] differently shaped, with narrower wings, longer and clearly banded tail (tip well exceeds wing-tips) and distinctive head pattern.

**VOICE** Noisy when breeding. 'Hard, often insistent screaming *kyowh-kyowh-kyowh...* or *kyah-kyah-kyah...* Also single, more barking screams, *kyow* or *kyowh*' (Howell & Webb). Rasping *aczeek, aczeek*. Penetrating, clear down-slurred whistle, repeated several times. (These calls quite distinct from those of Bat Falcon [299], which, despite some published descriptions, has clearly higher voice.) Soft piping notes used in courtship and food-transfers.

**FOOD** Birds; also bats, large insects. Typical prey medium-sized pigeons (Columbidae) and parrots (Psittacidae), and largish forest passerines, such as jays *Cyanocorax* and caciques *Cacicus*, but hirundines, swifts (Apodidae) and, at least at Tikal, Guatemala, many migrant waders also taken, such as Killdeer Plovers *Charadrius vociferus*, Pectoral Sandpipers *Calidris melanotos* and Lesser Yellowlegs *Tringa flavipes* (Jenny, Cade). Apparently hunts mainly by watching from high perch atop tallest tree (often on dead snag) or crag overlooking canopy, or where interface provided by river, forest edge or clearing, and then taking off in long, usually low flight, culminating in tail-chase (protracted and multidirectional if necessary), short upward swing or minimal stoop; large feet enable birds to be grabbed, rather than struck down and so possibly lost in forest. Often hunts bats and insects at dawn and dusk. Small prey eaten on wing. Extreme RSD considerably widens food spectrum available. Caching recorded.

**SOCIOSEXUAL BEHAVIOUR** Usually singly or in pairs, though pair less often perched together than is the case with Bat Falcons [299]. Can similarly enlarge head by erecting slightly elongated feathers of cheeks and upper neck, but effect is less hooded: 'somewhat owl-like'. As with other typical falcons, aerial displays varied and spectacular.

**BREEDING** Little known: March–June in Guatemala, January–April in Ecuador (dry season in both, young on wing at start of rains). Nests in cavity in tall emergent tree or rocky cliff face; also, probably exceptionally, in ruined temple; adds no material. Clutch 2–3 (1–3). Incubation c30 days. Fledging c40 days.

**POPULATION** Distribution spread only slightly less than that of Bat Falcon [299], approaching 12 million km<sup>2</sup>, but, so far as known, generally much less numerous and less adaptable to habitat change and man's environment; probably more seriously decreasing through deforestation and human settlement, which at least in Central America has also resulted in Black Vultures [1] occupying former nest-cliffs. Two lots of three pairs of Orange-breasted located within 20 km circles in Belize and north Guatemala in 1992, but some traditional sites there and in Ecuador and Peru had ceased to be occupied by 1979, and otherwise minimum distance between known eyries more like 50 km. One linear survey of nearly 7,900 km of suitable habitat in those four countries yielded only 15 Orange-breasted, compared with 95 Bat. Thus, one might surmise that present species is 6–7 times rarer, but the search was aimed at Orange-breasted's habitats, rather than Bat's, and actual difference in numbers probably far greater. Cade guessed 'perhaps a few hundred to a few thousand' for Orange-breasted.

**GEOGRAPHICAL VARIATION** Some adults in South America (e.g. Colombia, Brazil) have neck-sides and chest pale orangey-apricot (rather than orange or

rufous), chest also streaked blackish, and cere and orbital rings may be more green than yellow; whether such individuals represent separate geographical race or are simply variants remains to be established by further observations, but species is meanwhile regarded as monotypic. Relationships with superficially very similar, if smaller, Bat Falcon [299] have provoked much discussion; still uncertain whether resemblance due to divergence from close common ancestor or to convergence from different ancestors. Latter view favoured here: Bat close to hobby group, Orange-breasted replaces peregrine complex.

**MEASUREMENTS** ♂ wing 231–253 mm, ♀ 265–289 mm; ♂ tail 114–128 mm, ♀ 139–152 mm; ♂♀ tarsus 43–56 mm. Weights ♂ 330–360 g, ♀ 350–654 g.

**REFERENCES** Baker & Whitacre (1993), Baker *et al.* (1992), Blake (1977), Boyce (1980), Boyce & Kiff (1981), Cabot & Serrano (1986), Cade (1982), Contreras *et al.* (1990), de la Peña (1992), Fjeldså & Krabbe (1990), Friedmann (1950), Griscom (1992), Hardy *et al.* (1975), Haverschmidt (1962, 1968, 1980), Herman & Hedstrom (1990), Hilty & Brown (1986), Howell & Webb (1995), Howell & Whittaker (1995), Jenny (1989), Jenny & Cade (1986), Jenny & Burnham (1987), Kiff (1988), Meyburg (1986), Meyer de Schauensee & Phelps (1978), Narojczyk & Yzurieta (1987), Olrog (1985), Remsen & Ridgely (1980), Remsen & Taylor (1983), Ridgely & Gwynne (1989), Short (1975), Sick (1993), Slud (1964), Smithe (1966), Smithe & Paynter (1965), Stiles & Skutch (1989), Thollay (1989), Tostain (1980), Wetmore (1965), Whitacre & Jenny (1991), Whittaker (1996).

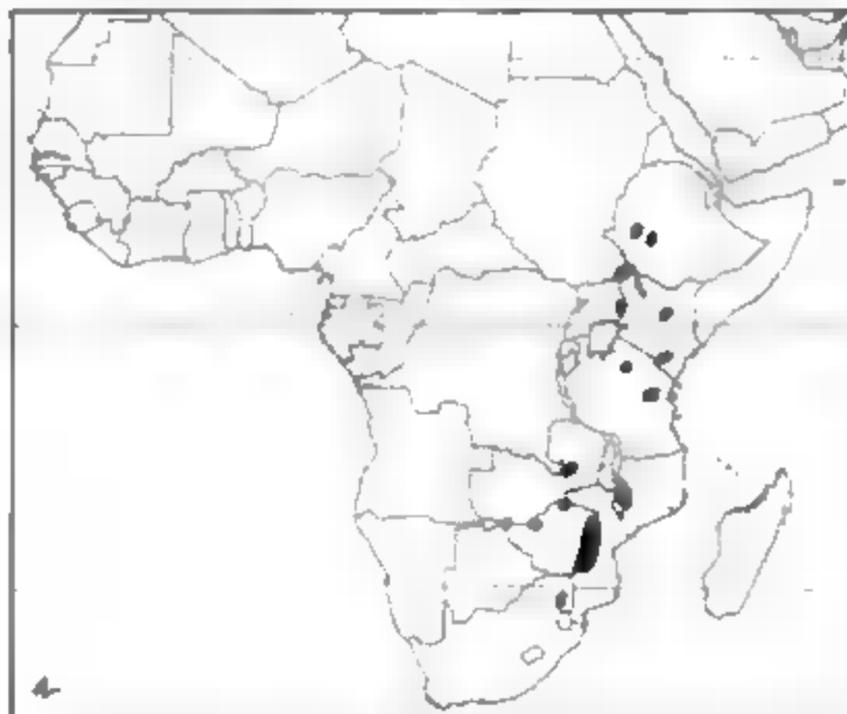
## 312 TAITA FALCON

*Falco fasciinucha* Reichenow & Neumann, 1895

Plate 110

Other spelling: Teita Falcon

**DISTRIBUTION** Afrotropical (8°N to 24°S); order 4; generally scarce to rare, and very local, though perhaps overlooked to some extent. Eastern Africa with fragmented range probably fairly continuous from south Ethiopia to northern Zimbabwe, but mainly concentrated in two well-separated regions: (a) south Ethiopia, southeast Sudan, easternmost Uganda, Kenya and north



Tanzania; and (b) southernmost Malawi and Zambia, western Mozambique, northeastern South Africa, and northern Zimbabwe, particularly in Zambezi gorge where relatively common.

**MOVEMENTS** Largely sedentary, but immatures and, outside breeding season, at least some adults appear to wander slightly outside main range, perhaps in search of concentrations of bird prey species.

**HABITAT** Highlands and mountains with cliffs, crags and gorges, mainly in regions of low rainfall, at times wandering well away into surrounding or more distant open wooded areas, watersides and partly cultivated country, and even into savannah. About 600–3,800 m.

**FIELD CHARACTERS** Small, stocky falcon, largely blackish and rufous with some white, and with compact shape. Spends much of day perched, usually on cliff ledge or bluff, or perhaps on tree or shrub growing out of cliff face; wing-tips reach end of short tail. Sexes similar but, though data quite inadequate, female likely to average at least 10% larger and perhaps much heavier; juvenile also rather similar, but distinguishable in good view; may attempt to breed at end of first year, when still in immature plumage.

**PERCHED Adult** Slate-grey above, with paler tail faintly barred and buff-tipped; blackish crown with rufous

patches on forehead and, distinctively, on nape; bold black moustaches well defined against white to cream throat and cheeks (latter usually outlined with some rufous); otherwise, all pale rufous below with very fine inconspicuous blackish shaft-streaks just noticeable on lower chest and flanks. **Juvenile** Rather similar, but browner-grey above with thin buff edges on scapulars, wing-coverts and remiges, less clear paler nape-patches, and darker tail with correspondingly more distinctive buff tip; duller rufous below and with streaking still fine but more conspicuous, streaks on lower flanks sometimes wider and more spot-like (overall pattern similar to that of some finer-marked juvenile male Peregrines [309] of African race minor). **Bare parts** Eyes dark brown. Cere, orbital rings and legs yellow at all ages.

**FLIGHT** Small raptor with shape of tiny Peregrine Falcon [309], though only two-thirds the size: stout body, broad-based and very pointed wings looking triangular when spread, and similarly wide-based but proportionately still shorter tail; wingspan 2.4 times total length. Fast shallow beats and stiff action look almost parrot-like; glides and soars on flat or slightly depressed wings. **Adult** Mainly dark grey above, with conspicuously paler rump and tail, latter obscurely barred, and usually clear rufous patches on nape; except for finely barred flight-feathers and tail, largely pale rufous to rufous-buff below (wing-linings actually finely spotted and barred with blackish), but cheeks and throat noticeably whiter. **Juvenile** Browner above, with darker rump concolorous with back, less contrasted tail with clear buff tip, and less obvious rufous nape-patches; and duller rufous below with somewhat more streaked underbody (lower flanks in particular sometimes more heavily marked), though underwing similar to adult (plate misleading in this respect), and still prominent white cheeks and throat.

**CONFUSION SPECIES** Confusion likely only with African Hobby [296], but that distinct possibility: adults of both are basically dark grey above and rufous with faint streaks below, and wrongly identified photographs and even specimens have been known. Outlines and flight, however, quite different: while Taita shaped like small Peregrine [309], with stout body, broad-based wings and short tail, African Hobby smaller and slimmer, with thinner and relatively longer wings and clearly longer tail. In addition, latter usually uniformly darker above, looking almost black, and all richer rufous below including wing-linings. Best single plumage distinctions of Taita are white throat and cheeks and, though not so obvious on juvenile, rufous-buff nape-patches, as well as, in the case of adults, pale grey rump and tail; beware that African Hobby can show some chestnut spotting on nape. Adult Barbary Falcon [310], also grey above with paler rump and rufous nape, is much larger and more lightly built, more rufous on crown, and more cinnamon and barred below; it is also strictly allopatric, without risk of wanderers overlapping except possibly in Ethiopia.

**VOICE** Probably silent outside breeding season. Main alarm near nest is loud, harsh, chattering 'kek-kek-kek...', said to be weaker and thinner than similar call of Peregrine [309]. Squealing or whining 'kree-kree-kree...' used probably by both sexes demanding attention and by young as food-call.

**FOOD** Birds, and apparently some insects; also single observations of possible lizard and small rodent. Largely

small birds, apparently chiefly in range 18–40 g but some up to 120 g and more: records include hirundines and swifts, perhaps with some regularity, queleas and bulbuls, and others ranging from cisticola to Red-winged Starling *Onychognathus morio*, White-collared Pratincole *Glareola nuchalis*, and even Violet-crested Turaco *Tauraco porphyreolophus* weighing 270 g. Has been reported taking butterflies and alate termites, eating these both perched and in flight. Hunts mainly by fast stoop, sometimes from perch but often from high-circling, sometimes shooting past prey and then swooping up to grasp it from below. Pair-members may hunt co-operatively on occasions. Male may cache prey until needed.

**SOCIOSEXUAL BEHAVIOUR** Solitary or, often, in pairs. Mutual soaring and calling only aerial display recorded.

**BREEDING** April–September in East Africa and July–December in southern Africa (from September in Zimbabwe). Simple scrape in stones or other debris in hole or crack – often narrow, well-shaded and difficult to see into – in basalt gorge, inselberg face or other cliff; several nests have been about three-quarters up cliffs 100–150 m high, but in South Africa recorded 30 m from base of 150-m cliff. Clutch 2–4. Incubation 31–33 days. Fledging c42 days.

**POPULATION** Relatively few pairs actually known but, for example, in over 100 km of gorges along the Zambezi between Lake Kariba and Victoria Falls, the most celebrated centre of distribution, this considered to reflect inaccessibility rather than rarity. Currently 8–10 pairs along 60 km of Zambezi gorges, four pairs on Uganda's Mt Elgon, and estimated 20–50 pairs in Zimbabwe (where number of breeding sites conservatively put at 50). Cade suggested total population 'may well number only a few hundred birds'. Having regard, however, to a total species range covering perhaps 0.5 million km<sup>2</sup> and how little known this bird is, we believe that four figures may be better guess. Apparently successful and not, despite earlier statements, competing with larger falcons, it has such inaccessible habitat that it is 'in no way endangered' (Dowsett). Nevertheless, the species has more recently been considered 'vulnerable' and nest-site competition from Lanner [305] and Peregrine [309] thought more possible, at least locally. Fears have been expressed about the likely adverse effects of pesticide-spraying in northern Zimbabwe, where a significant population of this species may be further threatened by a proposed dam on the Zambezi.

**GEOGRAPHICAL VARIATION** Monotypic.

**MEASUREMENTS** ♂ wing 202–208 mm, ♀ 229–240 mm; ♂♀ tail 74–87 mm. **Weights** ♂ 212–233 g (four), ♀ 297–346 g (five).

**REFERENCES** Benson (1960), Benson & Benson (1975), Benson & Smithers (1958), BirdLife International (2000), Black (1983), Britton (1980), Brooke & Howells (1971), Brown *et al.* (1982), Cade (1982), Colebrook-Robjent (1977), Dowsett (1977, 1983), Ginn *et al.* (1989), Hartley (1991, 1993), Hartley & Heinrich (1991, 1992), Hartley & Mundy (1990), Hartley *et al.* (1993), Holliday (1965), Hunter *et al.* (1979), Jenkins *et al.* (1991, 1992), Kemp & Kemp (1998), Lewis & Pomeroy (1989), Mackworth-Praed & Grant (1957, 1962), Maclean (1993), Madge (1971), Möller (1989), Pickford *et al.* (1989), Speer (1988), Steyn (1982), White *et al.* (1994), Woodall (1971).

# BIBLIOGRAPHY

- Abdulai, H. & Grubb, R. 1970. A new race of the Blackcrested Baza, *Aureo leucophotes* (Dumont), from the Andaman Islands. *J. Bombay Nat. Hist. Soc.* 67: 137-138.
- Abramson, I.J. 1967. The Black Hawk (*Buteogallus anthracinus*) in South Florida. *Amer. Birds* 30: 661-662.
- Abreu, R.M., de la Cruz, J., Rams, A. & Garcia, M.F. 1989. Vertebrados del complejo montañoso 'La Zoilita'. Holguín, Cuba. *Papeano Inst. Zool. Acad. Cienc. Cuba* 370.
- Abuladre, A. 1994a. Birds of prey in Georgia in the twentieth century. Pp. 23-28 in: Meyburg & Chancellor 1994b.
- Abuladre, A. 1994b. Lesser Spotted Eagle in Georgia. In: Meyburg & Chancellor 1994b.
- Abuladre, A. 1994c. Ecology of the Imperial Eagle (*Aquila heliaca*) in Georgia. In: Meyburg & Chancellor 1994b.
- Ade, B. 1985. African Cuckoo Hawk breeding at Diehwe. *Honeyguide* 31: 169.
- Agafonov, A.V., Rezinko, D.S., Rozkov, A.A. & Semenov, N.M. 1957. [On the ecology of the Steppe Eagle]. *Byull. Mosk. obshch. ispyt. prirody otd. biol.* 62: 33-41. In Russian.
- Agostini, N. 1992. Spring migration of Honey Buzzards (*Pernis ptilorhynchus*) at the Straits of Messina in relation to atmospheric conditions. *J. Raptor Res.* 26(2): 93-96.
- Aguilar-Rodríguez, S.H. 1998. First record of dilute plumage in Roadside Hawk, *Buteo magnirostris*. *J. Raptor Res.* 27(1): 49.
- Aguirre, A. 1947. Sooretama. *Bolet. Min. Agric., Rio de Janeiro* 36(4-6): 1-52.
- Ahlgren, C.G. & Eriksson, M.O.G. 1984. Exposure to mercury and organochlorines of Osprey in southwest Sweden. *Vår Fågelvärld* 15: 299-305.
- Åkesson, S. 1991. Secretary Bird *Sagittarius serpentarius* feeding on Marsh Warblers *Acrocephalus palustris* in Tsavo, Kenya. *Scopus* 15: 46-47.
- Akimov, M.P. 1940. [The colony of the Black Vulture *Argypus monachus* L. in the nature reserve of the Crimea]. *Trudy Krymskogo gos. zapovednika* 2: 217-227. In Russian.
- Albuquerque, J.L.B. 1978. Contribuição al conhecimento de *Falco peregrinus* Tunstall, 1771 na América do Sul (Falconidae, Aves). *Rev. Brasil. Biol.* 38: 727-737.
- Albuquerque, J.L.B. 1986. Conservation and status of raptors in southern Brazil. Pp. 88-94 in: Chancellor & Meyburg 1986.
- Albuquerque, J.L.B., Witich, A.J. & Aldous, A.M. 1986. A roadside count of diurnal raptors in Rio Grande do Sul, Brazil. Pp. 82-87 in: Chancellor & Meyburg 1986.
- Alerstam, T. 1990. *Bird Migration*. Cambridge University Press, Cambridge, UK.
- Ali, S. & Ripley, S.D. 1978. *Handbook of the Birds of India and Pakistan. Vol. 1*. 2nd edition. Oxford University Press, Delhi.
- Allan, D. 1988a. Breeding success, nest spacing and territory size of Black Eagles in the Magaliesberg, South Africa. *Gabier* 5: 76-81.
- Allan, D. 1988b. Raptors nesting on transmission pylons. *Afr. Wildl.* 42: 325-326.
- Allan, D. 1992. Long distance movements of Forest Buzzards in South Africa. *Gabier* 7: 26-27.
- Allan, D.G. & Hustler, C.W. 1984. The biology of the Ovambo Sparrowhawk (extended abstract). Pp. 57-58 in: Proceedings 2nd Symposium African Predatory Birds. Natal Bird Club, Durban.
- Allen, F.G.H. 1949. A mating between Changeable Hawk-Eagles in different colour phases. *Malay. Nat. J.* 5: 42.
- Allen, G.T. 1987. Prairie Falcon aerie site characteristics and aerie use in North Dakota. *Condor* 89: 187-190.
- Allen, G.T., Murphy, R.K., Steenhof, K. & Platt, S.W. 1986. Late fledging dates, re-nesting, and large clutches of Prairie Falcon. *Wilson Bull.* 98: 463-465.
- Allport, G. 1991. The status and conservation of threatened birds in the Upper Guinea forest. *Bird Conserv. Int.* 1: 53-74.
- Alonso, J.C., González, L.M., Heredia, B. & González, J.L. 1987. Parental care and the transition to independence of the Spanish Imperial Eagle (*Aquila adalberti*) in Doñana National Park, SW Spain. *Ibis* 129: 212-231.
- Alström, P. 1997. Field identification of Asian *Gyps* vultures. *OBC Bulletin* 25: 32-49.
- Altenburg, W., Daan, S., Starckenburg, J. & Zijlstra, M.J. 1982. Polygamy in the Marsh Harrier (*Circus aeruginosus*): individual variation in hunting performance and number of mates. *Behaviour* 79: 275-312.
- Alvarez, E. 1993. Synopsis: what we have learned about the Harpy Eagle. *Pronghorn Fund Newsl.* 23(Winter): 14.
- Alvarez, E. 1994. Harpy Eagles. *Wildbird Magazine* 1: 30-33.
- Alvarez, V.B. & Montiel, J.F. 1984. Genetic polymorphism of the Cuban Sparrow Hawk. *Papeano Inst. Zool. Acad. Cienc. Cuba* 283: 1-11.
- Amadon, D. 1949. Notes on *Harpyhaliaetus*. *Auk* 66: 55-56.
- Amadon, D. 1950. What is *Spizartus devilliei* Dubois? *Auk* 67: 235-236.
- Amadon, D. 1955. Remarks on the Asiatic Hawk-eagles of the genus *Spizartus*. *Ibis* 95: 492-500.
- Amadon, D. 1954. On the correct names for the Caracaras and for the Long-winged Harrier. *Auk* 71: 203-204.
- Amadon, D. 1959. The significance of sexual differences in size among birds. *Proc. Am. Phil. Soc.* 105: 531-536.
- Amadon, D. 1960. Notes on the genus *Chondrohierax*. *Novidades Colombianas* 1(5): 237-238.
- Amadon, D. 1961a. Relationships of the Cinereous Harrier. *Auk* 78: 256-257.
- Amadon, D. 1961b. Relationships of the falconiform genus *Harpagus*. *Condor* 63: 178-179.
- Amadon, D. 1961c. Remarks on the genus *Buteogallus*. *Novidades Colombianas* 1(8): 358-360.
- Amadon, D. 1963. Comparison of fossil and recent species: some difficulties. *Condor* 65(5): 407-409.
- Amadon, D. 1964. Taxonomic notes on birds of prey. *Amer. Mus. Novit.* 2166: 1-24.
- Amadon, D. 1974. Taxonomic notes on the Serpent-eagles of the genus *Spilornis*. *Bull. Brit. Orn. Club* 94: 159-163.
- Amadon, D. 1975. Why are female birds of prey larger than males? *J. Raptor Res.* 9: 1-11.
- Amadon, D. 1977. Further comments on sexual size dimorphism in birds. *Wilson Bull.* 89: 619-620.
- Amadon, D. 1978. Remarks on the taxonomy of some Australasian raptors. *Emu* 78: 115-118.
- Amadon, D. 1982a. The genera of booted eagles: *Aquila*, and relatives. *J. Ornithol. Inst. Orn.* 142-5: 108-121.
- Amadon, D. 1982b. A revision of the sub-buteonine hawks (Accipitridae, Aves). *Amer. Mus. Novit.* 2741: 1-20.
- Amadon, D. 1985. The Everglades Kite. *Florida Field Nat.* 11(4): 69-72.
- Amadon, D. & Bull, J. 1988. Hawks and Owls of the World. A Distributional and Taxonomic List. *Proc. West. Found. Vert. Zool.* 31(4): 295-357.
- Ambrosenti, H.T. 1919. Notas sobre algunas rapaces. *Hornos* 1: 287-290. *American Ornithologists' Union* 1987.
- Ames, P.L. 1966. DDT residues in the eggs of the Osprey in the northeastern USA and their relation to nest success. *J. Appl. Ecol.* 3(Suppl.): 87-89.
- Anderson, D.J., Reeve, J., Martinez-Gomez, J.E., Weathers, W.W., Hutson, S., Cunningham, H.V. & Bird, D.M. 1993. Sexual size dimorphism and food requirements of nestling birds. *Canadian Journal of Zoology* 71(12): 2541-2545.
- Anderson, D.J., Budde, C., Apanius, V., Martinez, G.J.E., Bird, D.M., Weathers, W.W. 1993. Prey size influences female competitive dominance in nestling American kestrels (*Falco sparverius*). *Ecology Washington D.C.* 74(2): 367-376.
- Anderson, D.W. & Hickey, J.J. 1972. Egg-shell changes in certain North American birds. Pp. 514-540 in: Proc. XV Int. Orn. Congr., The Hague, 1970.
- Anderson, M. & Norberg, R.A. 1981. Evolution of reversed sexual size dimorphism and role partitioning among predatory birds, with a size scaling of flight performance. *Biol. J. Linn. Soc.* 15: 105-150.
- Anderegg, R. 1982. *Bartgeier, Wildbiologie: Biologie Einheimischer Wildarten* 11(1). *Schul. Dok. Wild. Forsch.*, Zurich.
- Andrada, J. & Franco, A. 1975. Sobre el área de invernada de *Falco naumanni* en España. *Ardeola* 21: 321-324.
- Andrew, D. 1991. Red Goshawks safe...for now. *Wingspan* 2: 1-2.
- Andrew, P. 1985. An annotated checklist of the birds of Cibodas-Gunung Gede Nature Reserve. *Kukula* 2: 10-28.
- Andrews, M.A. 1982. *The Flight of the Condor*. Collins/British Broadcasting Corporation, London.
- Andrie, R. 1967. [Migration of *Buteo brachyurus*]. *Wilson Bull.* 79: 163-197.
- Angus, R.J. 1992. Notes on nesting Black-breasted Buzzards and other raptors in Sturt National Park. *Austr. Birds* 26: 13-16.
- Anon. 1984. Hawaiian Hawk Recovery Plan. US Fish and Wildlife Service, Portland, Oregon.
- Anon. 1988. A study of the northward migration of Grey-faced Buzzard-Eagles passing Pakua Mountain in the spring. *Ann. Taipei Wild Bird Soc.* 1988: 12-18.

- Anon. 1991c. Harpia. *Vida Silvestre* 23: 49-50.
- Anon. 1992. Peregrine Falcon Recovery Program, Status and Recommendations. The Peregrine Fund, Boise, ID.
- Anthony, A.J. 1976. The Lappet-faced Vultures of the Gomarezhou. *Bolmakerie* 28: 54-57.
- Anthony, A.J., Komen, J. & Mundy, P.J. 1980. Lappet-faced Vultures (*Torgus trachelioides*) hatch and rear a White-headed Vulture (*Trigonoceps occipitalis*) in the wild. *J. Zool., London* 191: 503-508.
- Anthony, R.G., Knight, R., Allen, G., McClelland, B. & Hodges, J. 1982. Habitat use by nesting and roosting Bald Eagles in the Pacific Northwest. *Trans. North Amer. Wildl. Nat. Resour. Conf.* 47: 332-342.
- Arad, Z.U., Midtgard, U. & Bernstein, M.H. 1989. Thermoregulation in Turkey Vultures: vascular anatomy, arteriovenous heat exchange and behaviour. *Condor* 91: 505-514.
- Aradi, C. 1964. Levant Sparrowhawk nesting in the Nagyerdő of Debrecen. *Aguda* 69-70: 248-251.
- Araujo, J., Muñoz-Cobo, J. & Purroy, F.J. 1977. Las Rapaces y Aves Marinas del Archipiélago de Cabrera. *Naturalia Hispanica* 12. ICONA, Madrid.
- Armstrong, R.H. 1983. *A New Expanded Guide to the Birds of Alaska*. Alaska Northwest Publishing Company, Anchorage, Alaska.
- Arroyo, B., Bueno, J.M. & Pérez-Mellado, V. 1976. Biología de reproducción de una pataja de *Hieraaetus fasciatus* en España Central. *Doklana Acta Vertebrata* 3(1): 33-45.
- Arroyo, B. 1989. Resultados del censo nacional de águila perdicera. *Quercus* 70: 17.
- Arroyo, B., Ferreira, E. & Garza, V. 1990a. El Águila Real (*Aquila chrysaetos*) en España. Censo, Distribución, Reproducción y Conservación. ICONA, Madrid.
- Arroyo, B., Ferreira, E. & Garza, V. 1990b. El Censo Nacional de Buitre Leonado (*Gyps fulvus*): Población, Distribución, Demografía y Conservación. ICONA, Madrid.
- Arroyo, B., Ferreira, E. & Garza, V. 1990c. Inventario de la Población Española de Águila Perdicera (*Hieraaetus fasciatus*) y sus Áreas de Cría. ICONA, Madrid.
- Ash, J.S. 1993. Raptor migration on Bali, Indonesia. *Forktail* 9: 3-11.
- Ash, J.S. & Miskell, J.E. 1983. Birds of Somalia. Their Habitats, Status and Distribution. *Scopus Special Supplement* 1. 97 pp.
- Attwell, R.J.G. 1963. Some observations on feeding habits, behaviour and inter-relationships of Northern Rhodesian Vultures. *Ostrich* 34: 235-247.
- Auburn, J. 1987. RSD and the agility of the Bat Hawk. *Gabari* 2: 13-16.
- Auburn, J. 1988. Why Wahlberg's Eagle is not a *Hieraaetus* eagle. *Gabari* 3: 15-18.
- Auburn, J. 1991. The timing of Wahlberg's Eagles' migrations through Central Africa. *Gabari* 6: 64-67.
- Aumann, T. 1988a. Breeding behaviour of the Brown Goshawk *Accipiter fasciatus*. *Austr. Bird Watcher* 12: 258-267.
- Aumann, T. 1988b. The diet of the Brown Goshawk *Accipiter fasciatus*. *Austr. Wildl. Res.* 15: 587-594.
- Aumann, T. 1988c. Foraging behaviour of the Brown Goshawk (*Accipiter fasciatus*) in southeastern Australia. *J. Raptor Res.* 22: 17-21.
- Aumann, T. 1988d. The morphology of the Brown Goshawk *Accipiter fasciatus*. *Covella* 12: 33-42.
- Aumann, T. 1989a. Breeding parameters of the Brown Goshawk *Accipiter fasciatus* in south-eastern Australia. *Emu* 89: 112-118.
- Aumann, T. 1989b. Prey at a Brown Goshawk nest near the You Yangs Range, Victoria. *Austr. Bird Watcher* 13: 154.
- Aumann, T. 1990a. The use of stones by the Black-breasted Buzzard *Hamirosto melanosternon* to gain access to egg contents for food. *Emu* 90: 141-144.
- Aumann, T. 1990b. The breeding behaviour of a Brown Goshawk *Accipiter fasciatus didimus* pair. *Austr. Bird Watcher* 13: 156-163.
- Aumann, T. 1990c. Morphological notes for *Accipiter* species in northern Queensland. *Covella* 14: 156-160.
- Aumann, T. 1993. Seasonal movements of the Brown Goshawk *Accipiter fasciatus* in Australia. In: Olsen 1993a.
- Aumann, T. & Baker-Gabb, D.J. 1991. The Ecology and Status of the Red Goshawk in Northern Australia. *RAOU Report* 75. Royal Australasian Ornithologists' Union, Melbourne.
- Austin, O.L. 1948. The Birds of Korea. *Bulletin of the Museum of Comparative Zoology* 101. Cambridge, Mass.
- Austin, O.L. & Kuroda, N. 1953. Birds of Japan. Their Status and Distribution. *Bulletin of the Museum of Comparative Zoology* 109. 279-657. Cambridge, Mass.
- Austing, G.R. 1964. *The World of the Red-tailed Hawk*. J.B. Lipincott Co., Philadelphia.
- Babenko, V.G., Mazhulis, D.V., Ostapenko, V.A. & Pererva V.I. 1988a. [Distribution, number and nesting ecology of Steller's Sea Eagle (*Haliaeetus pelagicus*) on the area of Lower Amur river.] *Arch. Zool. Mus., Moscow State Univ.* 26: 207-224. In Russian.
- Babenko, V.G., Mazhulis, D.V., Ostapenko, V.A., Pererva V.I. & Poyarko, N.D. 1988b. [Breeding of the Steller's Sea Eagle in the Low Praimurje]. Pp. 132-157 in: Litvinenko 1988. In Russian.
- Backhurst, G.C., Britton, P.L. & Mann, C.F. 1973. The less common Palearctic migrant birds of Kenya and Tanzania. *J. East Afr. Nat. Hist. Soc. & Natl. Mus.* 140: 1-38.
- Bagyura, J., Harasathy, I. & Szitta, T. 1994a. Methods and results of Saker Falcon *Falco cherrug* management and conservation in Hungary. In: Meyburg & Chancellor 1994a.
- Bagyura, J., Harasathy, I. & Szitta, T. 1994b. Feeding biology of the Saker Falcon *Falco cherrug* in Hungary. In: Meyburg & Chancellor 1994a.
- Baha El Din, S. 1984. Notes on the breeding of the Sooty Falcon *Falco tinnunculus* on islands in the Red Sea, and their prey. *Bull. Orn. Soc. Middle East* 12: 2-3.
- Baker, A.J.P. & Whitacre, D.F. 1993. Orange-breasted Falcon reproduction, density and behaviour in northern Central America. *J. Raptor Res.* 27(1): 64.
- Baker, A.J.P., Jenny, J.P. & Whitacre, D.F. 1992. Orange-breasted Falcon reproduction, density, and behaviour in Guatemala and Belize. Pp. 217-224 in: Whitacre & Thorstrom 1992.
- Baker, E.C.S. 1928. *The Fauna of British India, including Ceylon and Burma*. Vol. 5. Birds. Taylor and Francis, London.
- Baker, E.C.S. 1935. *The Nidification of Birds of the Indian Empire*. Vol. IV. Taylor & Francis, London.
- Baker-Gabb, D.J. 1978. Aspects of the Biology of the Australasian Harrier *Circus approximans approximans*. MSc thesis, Massey University, Palmerston North, New Zealand.
- Baker-Gabb, D.J. 1979. Remarks on the taxonomy of the Australasian Harrier (*Circus approximans*). *Notornis* 26: 325-329.
- Baker-Gabb, D.J. 1981a. Breeding behaviour and ecology of the Australasian Harrier (*Circus approximans*) in the Manawatu-Rangitikei sand country, New Zealand. *Notornis* 28: 103-119.
- Baker-Gabb, D.J. 1981b. The diet of the Australasian Harrier *Circus approximans* in the Manawatu-Rangitikei sand country, New Zealand. *Notornis* 28: 241-254.
- Baker-Gabb, D.J. 1982a. Comparative Ecology and Behaviour of Swamp Harriers *Circus approximans*, Spotted Harriers *C. assimilis* and Other Raptors in Australia and New Zealand. PhD thesis, Monash University, Melbourne.
- Baker-Gabb, D.J. 1982b. Asynchronous hatching, fratricide and double clutches in the Marsh Harrier. *Covella* 6: 83-86.
- Baker-Gabb, D.J. 1983. Observations on the mating system and breeding success of the Marsh Harrier in coastal south-eastern Australia. *Covella* 7: 109-113.
- Baker-Gabb, D.J. 1984a. The feeding ecology and behaviour of seven species of raptor overwintering in coastal Victoria. *Austr. Wildl. Res.* 11: 517-532.
- Baker-Gabb, D.J. 1984b. The breeding ecology of twelve species of diurnal raptor in north-western Victoria. *Austr. Wildl. Res.* 11: 145-160.
- Baker-Gabb, D.J. 1984c. The evolution of tree-nesting and the origin of the Spotted Harrier. *Covella* 8: 67-69.
- Baker-Gabb, D.J. 1985a. Autumn breeding by the Spotted Harrier *Circus assimilis*. *Austr. Bird Watcher* 11: 48.
- Baker-Gabb, D.J. 1985b. Australasian Harrier *Circus approximans*. Pp. 152-153 in: Robertson 1985.
- Baker-Gabb, D.J. 1985c. Display of the Grey Goshawk *Accipiter novaehollandiae*. *Austr. Bird Watcher* 11: 67.
- Baker-Gabb, D.J. 1985d. Close nesting of Little Eagles *Hieraaetus morphnoides*. *Austr. Bird Watcher* 11: 100.
- Baker-Gabb, D.J. 1985e. Nesting density of Australian Kestrels *Falco tinnunculus*. *Austr. Bird Watcher* 11: 66.
- Baker-Gabb, D.J. 1986. Ecological release and behavioural and ecological flexibility in Marsh Harriers on islands. *Emu* 86: 71-81.
- Baker-Gabb, D.J. 1989. Notes on breeding Black Falcons *Falco subniger*. *Austr. Bird Watcher* 13: 101.
- Baker-Gabb, D.J. 1990. Breeding and other behaviour of the Black-breasted Buzzard *Hamirosto melanosternon*. *Austr. Bird Watcher* 13: 251-255.
- Baker-Gabb, D.J. 1993. Wing tags, winter ranges and movements of Swamp Harriers *Circus approximans* in south-eastern Australia. In: Olsen 1993a.
- Baker-Gabb, D.J. & Fitzherbert, K. 1989. An overview of raptor movements and wintering places in Australia and New Zealand. Pp. 159-166 in: Meyburg & Chancellor 1989.
- Baker-Gabb, D.J. & Pettigrew, J. 1982. Non-

- rica Natural History Society, Nairobi.
- Brown, L.H. & Brown, B.E. 1979. The behaviour of the Black Sparrow Hawk *Accipiter melanoleucus*. *Ardea* 67: 3-4.
- Brown, L.H. & Bursell, G. 1968. A first breeding record of the Cuckoo Falcon in Kenya. *J. East Afr. Nat. Hist. Soc.* 27: 49-51.
- Brown, L.H. & Cade, T.J. 1972. Age classes of the Bateleur and African Fish Eagle. *Ostrich* 43: 1-16.
- Brown, L.H. & Davey, P.R.A. 1978. Natural longevity in Ayres' Eagle *Hieroaetus dubius*. *Bokmakervogel* 50: 27-31.
- Brown, L.H. & Hopcraft, J.B.D. 1975. Population structure and dynamics of the African Fish Eagle *Hieroaetus vocifer* at Lake Naivasha, Kenya. *East Afr. Wildl. J.* 11: 255-269.
- Brown, L.H. & Watson, A. 1964. The Golden Eagle in relation to its food supply. *Ibis* 106: 78-100.
- Brown, L.H., Gargett, V. & Steyn, P. 1978. Breeding success in some African Eagles related to theories about sibling aggression and its effects. *Ostrich* 48: 63-71.
- Brown, L.H., Urban, F.K. & Newman, K. 1982. *The Birds of Africa*. Vol. 1. Academic Press, London & New York.
- Brown, M. 1987. Bald Eagle and Short-tailed Hawk prey on other raptors. *Florida Field Nat.* 15(1): 19-20.
- Brown, P.F. 1979. *The Scottish Ospreys from Extinction to Survival*. Heinemann, London.
- Brown, P.F. & Waterston, G. 1962. *The Return of the Osprey*. Collins, London.
- Brown, W.H. 1971. Winter population trends in the Red-shouldered Hawk. *Amer. Birds* 25: 813-817.
- Brown, W.H. 1976. Winter population trends in the Black and Turkey Vultures. *Amer. Birds* 30: 909-912.
- Browne, P.W.P. 1981. New bird species in Mauritania. *Molimbus* 3: 63-72.
- Browning, M.R. 1974. Comments on the winter distribution of the Swainson's Hawk (*Buteo swainsoni*) in North America. *Amer. Birds* 28: 865-867.
- Buce, M.D. 1987. Additions to the birds of Wallacea. I. Bird records from smaller islands in the Lesser Sunda. *Kukula* 3(1-2): 38-44.
- Brüll, H. 1964. *Das Leben Deutscher Greifvögel*. 2 Aufl., Fischer, Stuttgart, Germany.
- Brüll, H. 1977. *Das Leben Europäischer Greifvögel*. 3 edn. Fischer, Stuttgart, Germany.
- Bruning, D. 1983a. Breeding condors in captivity for release into the wild. *Zoo Biology* 2: 245-252.
- Brunn, B. 1981. The Lappet-faced Vulture in the Middle East. *Sandgroen* 2: 91-95.
- Brunn, B. 1984. *Hamlyn Guide to Birds of Britain and Europe*. Hamlyn, London.
- Brunn, B., Mendelsohn, H. & Bull, J. 1981. A new subspecies of Lappet-faced Vulture *Torgus tracheliatus* from the Negev Desert, Israel. *Bull. Brit. Orn. Club* 101: 244-247.
- Buchanan, J.B. 1988. North American Merlin populations: an analysis using Christmas Bird Count data. *Amer. Birds* 42: 1178-1180.
- Buchanan, J.B., Schuck, C.L., Brennan, L.A. & Hexman, S.G. 1988. Merlin predation on wintering Dunlins, hunting success, and Dunlin escape tactics. *Wilson Bull.* 100: 108-118.
- Buckingham, D.L., Dorson, G.C.L. & Newman, J.L. 1995. *Birds of Manus, Kolombangara & Makira (San Cristobal) with notes on mammals and records from other Solomon Islands*. Report of the Solomons Rainforest Project, Cambridge 1990.
- Buckley, P.A., Foster, M.S., Morton, E.S., Ridgely, R.S. & Buckley, F.G. 1985. *Neotropical Ornithology*. Ornithological Monographs 56. American Ornithologists' Union, Washington, D.C.
- Burkhill, J.A. & Chasen, F.N. 1990. *Birds of Singapore and South-East Asia*. Jentun Press, Scotland.
- Buhot, D. 1985. Deux mois d'observation d'un couple d'Aigles de Bonelli, *Hieroaetus fasciatus* (Vieillot) en Israël. *Alauda* 51(2): 92-108.
- Buhot, D. 1989. Etho-écologie comparée de l'Aigle de Bonelli *Hieroaetus fasciatus*, Vieillot. *Alauda* 57(1): 71-75.
- Bullock, I. 1900. *Birds of the Republic of Seychelles*. Seychelles Ministry of Education & R.B.P.
- Bundy, G. 1976. *The Birds of Libya*. BCU Checklist British Ornithologists' Union, London.
- Burnham, W.A. & Matton, W.G. 1984. Biology of the Peregrine and Gyrfalcon in Greenland. *Medd. Grönland* 14: 1-30.
- Burns, F.I. 1911. A monograph of the Broad-winged Hawk (*Buteo platypterus*). *Wilson Bull.* 23: 139-320.
- Burton, A.M. 1991. Resource partitioning between two sympatric goshawks in the Australian wet tropics. PhD thesis, James Cook University, Townsville, Australia.
- Burton, A.M. 1993. Cannibalism at a Brown Goshawk nest. *Aust. Bird Watcher* 15: 45.
- Burton, A.M. & Alford, R.A. 1994. Morphometric comparison of two sympatric goshawks in the Australian wet tropics. *J. Zool. (Lond.)* 232: 525-538.
- Burton, A.M., Alford, R.A. & Young, J. 1994. Reproductive parameters of the Grey Goshawk (*Accipiter novae-hollandiae*) and Brown Goshawk (*Accipiter fasciatus*) at Abergowie, northern Queensland, Australia. *J. Zool. (Lond.)* 232: 347-363, 525-538.
- Burton, P.J.K. 1978. The intertarsal joint of the harrier-hawks, *Polyboroides* spp. and the Crane-Hawk *Geranoospiza caeruleus*. *Ibis* 120: 171-177.
- Burton, P. & Bower, I. 1989. *Birds of Peru*. Gallery Books, New York.
- Buskirk, W.H. & Lechner, M. 1978. Frugivory by the Swallow-tailed Kite in Costa Rica. *Auk* 95(4): 767-768.
- Bustamante, J. 1993. Post-fledging dependence period and development of flight and hunting behaviour in the Red Kite *Milvus milvus*. *Bird Study* 40(3): 181-188.
- Bustamante, J. 1994. Behaviour of colonial common kestrels (*Falco tinnunculus*) during the post-fledging dependence period in southwestern Spain. *J. Raptor Res.* 28: 73-83.
- Bustamante, J. & Hiraldo, F. 1989. Post-fledging dependence period and maturation of flight skills in the Black Kite (*Milvus migrans*). *Bird Study* 36: 198-204.
- Bustamante, J. & Hiraldo, F. 1988. Factors influencing family rupture and parent-offspring conflict in the Black Kite *Milvus migrans*. *Ibis* 132: 58-67.
- Bustamante, J. & Hiraldo, F. 1995. The functional aggressive chases in breeding Black and Red Kites *Milvus agrippa* and *M. milvus* during the post-fledging dependence period. *Ibis* 135: 139-147.
- Bustamante, J. & Negro, J.J. 1994. The post-fledging dependence period of the Lesser Kestrel (*Falco naumanni*) in southwestern Spain. *J. Raptor Res.* 28: 79-83.
- Butchart, D. 1989. Some notes on the Palmnut Vulture in northern Zululand. *Vulture News* 21: 22-24.
- Butcher, G.S. & Rohwer, S. 1989. The evolution of conspicuous and distinctive coloration for communication in birds. *Curr. Orn.* 6: 51-108.
- Butler, A.L. 1899. The Birds of the Andaman and Nicobar Islands. *J. Bombay Nat. Hist. Soc.* 12: 684-690.
- Butler, T.Y. 1979. *The Birds of Ecuador and the Galapagos Archipelago*. The Ramphastos Agency, Portsmouth, NH.
- Butynski, T.M. & Kalina, J. 1988. First Rufous-chested Sparrowhawk breeding record for East Africa. *Gabari* 3: 94-98.
- Cabot, J. 1991. Distribution and habitat selection of *Buteo polyzona* and *Buteo borealis* in Bolivia and neighboring countries. *Bull. Brit. Orn. Club* 111(4): 199-209.
- Cabot, J. & Serrano, P. 1986. Data on the distribution of some species of raptors in Bolivia. *Bull. Brit. Orn. Club* 106(4): 170-173.
- Cabot, J. & Serrano, P. 1988. Distributional data on some non-passerine species in Bolivia. *Bull. Brit. Orn. Club* 108(4): 187-195.
- Cabot, J., Castroviejo, J. & Urios, V. 1988. Cuatro nuevas especies de aves para Bolivia. *Dominica Acta Vertebrata* 15: 21-33.
- Cade, T.J. 1955. Variation of the Common Rough-legged Hawk in North America. *Condor* 57: 313-346.
- Cade, T.J. 1960. Ecology of the Peregrine and Gyrfalcon populations in Alaska. *Univ. Calif. Publ. (Zool.)* 63: 151-290.
- Cade, T.J. 1968. The Gyrfalcon and falconry. *Living Bird* 7: 237-240.
- Cade, T.J. 1980a. [Review of] *Population Ecology of Raptors* by Ian Newton. *J. Wildlife Management* 44: 969-972.
- Cade, T.J. 1980b. The husbandry of falcons for return to the wild. *Int. Zoo. Yearbook* 20: 23-25.
- Cade, T.J. 1982. *The Falcons of the World*. Collins, London & Cornell University Press, Ithaca, NY.
- Cade, T.J. & Bird, D.M. 1990. Peregrine Falcons, *Falco peregrinus*, nesting in an urban environment: a review. *Canadian Field-Nat.* 104: 209-218.
- Cade, T.J. & Jones, C.G. 1998. Progress in restoration of the Mauritius Kestrel. *Conserv. Biol.* 7: 169-175.
- Cade, T.J., Enderson, J.H., Thelander, C.G. & White, C.M. eds. 1988. *Peregrine Falcon Populations: Their Management and Recovery*. The Peregrine Fund, Inc., Boise, ID.
- Cain, A.J. & Galbraith, I.C.J. 1956. Field notes on the birds of the eastern Solomon Islands. *Ibis* 98: 100-134, 262-265.
- Calaby, J.H. 1951. Notes on the Little Eagle; with particular reference to rabbit predation. *Emu* 51: 33-36.
- Cacho, R. & Vikoria, A.L. 1991. Occurrence of the Andean Condor in the Petija Mountains of Venezuela. *Wilson Bull.* 103(4): 720-722.
- Calderon, J., Castroviejo, J., Garcia, I. & Ferrer, M. 1987. El Águila Imperial (*Aquila neohisteria*) en Dominica: Algunos aspectos de su reproducción. *Ayles* 5: 47-52.
- Calderton, J., Castroviejo, J., Garcia, I. &

- des rapaces provençaux. IV. La reproduction du Vautour péronoptère *Neophron peronopterus*, de l'Aigle de Bonelli *Hieraetus fasciatus* et du Faucon Crécellette *Falco naumanni* en 1980. *Bull. Centre Rech. Orn. Provence* 3: 4-8.
- Chevlan, G. 1981. Sur le rôle déterminant de l'abondance des ressources dans le succès de reproduction de l'Aigle de Bonelli *Hieraetus fasciatus* en Provence. Pp. 95-99 in: *Rapaces Méditerranéens I*. Aix-en-Provence.
- Chevlan, G. & Simeon, D. 1984. La reproduction de l'Aigle de Bonelli en Provence 1982-1983-1984. *Bull. Centre Rech. Orn. Provence* 6: 36-37.
- Ching, H.-c., Yu S.-t. & Chiang, C.-h. 1989. A Survey of Grey-faced Buzzard-Eagle Hunting in Manchou Ann. Part II. Kenting National Park.
- Chittenden, H.N. 1979. The incubation nestling and post nestling periods of the Lizard Buzzard *Kaupifalco monogrammicus*. *Ostrich* 50: 186-187.
- Chittenden, H.N. 1984. Aspects of Cuckoo Hawk *Aviceda cuculoides* breeding biology. Pp. 47-56 in Mendelsohn & Sapford.
- Christensen, J. 1979. The breeding habitat, nest-site and nest of the Greenland White-tailed Eagle. *Dan Orn. Foren. Tidst.* 88: 131-156. In Danish.
- Christensen, S. & Sørensen, U.G. 1989. A review of the migration and wintering of *Aquila pomarina* and *Aquila nipalensis orientalis*. Pp. 139-150 in: Meyburg & Chancellor 1989.
- Clubb, C. 1918. New forms of South and Central American birds. *Bull. Brit. Orn. Club* 39: 21-23.
- Ciaccio, A., Dimarzio, A., Lo Valvo, F., Siracusa, M. 1987. Primi dati sulla biologia e lo status del Lamario (*Falco barmicus*) in Sicilia. In: Baccetti & Spagnesi 1987.
- Clancey, P.A. 1966. The avian superspecies of the South African fauna. *Ostrich* 6 (Suppl.): 13-39.
- Clancey, P.A. 1968a. *Falco concolor* Temminck in South Africa. *Bull. Brit. Orn. Club* 89: 10-11.
- Clancey, P.A. 1968b. Variation in *Falco johnstoni* P. L. Selater, 1964. *Bull. Brit. Orn. Club* 88: 120-123.
- Clancey, P.A. 1985. *The Rapt Birds of Southern Africa*. Winchester Press, Johannesburg.
- Clancey, P.A. 1987a. Subspeciation in the Afrotropical Goshawk *Micronis gubar*. *Bull. Brit. Orn. Club* 107: 173-177.
- Clancey, P.A. 1987b. The authorship of the raptor name *Circus fasciolatus*. *Bull. Brit. Orn. Club* 107: 191-192.
- Clancey, P.A. 1990. Further on the raptor name *Circus fasciolatus*. *Bull. Brit. Orn. Club* 110: 110.
- Clancy, G.P. 1991. *The biology and management of the Osprey Pandion haliaetus cristatus in New South Wales. Species Management Report 6*, NSW National Parks & Wildlife Service, Sydney.
- Clancy, G.P. 1989. A survey of breeding Ospreys *Pandion haliaetus* in north-eastern coastal New South Wales, 1980 to 1982. *Condalia* 13: 9-14.
- Clancy, G.P. 1993. The conservation status of the Osprey *Pandion haliaetus* in New South Wales. In: Olsen 1993a.
- Clapp, G.E. 1987. Birds of the lower Sibilan Mountains, Papua New Guinea. *Musik* 2: 45-52.
- Clark, A.L. 1974. The population and reproduction of the Eleonora's Falcon in Morocco. *Bull. Soc. Sci. Nat. et Phys. Marseille* 54: 61-69.
- Clark, R. 1986. *Aves de Tierra del Fuego y Cabo de Hornos. Guía de Campo. Literature of Latin America (L.O.L.A.)*, Buenos Aires.
- Clark, R.G. & Ohmart, R.D. 1985. Spread winged posture of Turkey Vultures; single or multiple function? *Condor* 87: 350-355.
- Clark, T.W., Harvey, A.H., Dorn, R.D., Genter, D.L. & Groves, C. 1989. *Rare, Sensitive and Threatened Species of the Greater Yellowstone Ecosystem*. Northern Rockies Conservation-Cooperative, Montana Natural Heritage Program, The Nature Conservancy and Mountain West Environmental Services.
- Clark, W.S. 1981. Flight identification of common North American Buteos. *Cont. Bird.* 2: 129-143.
- Clark, W.S. 1983. Flight identification of North American eagles. *Amer. Birds* 37: 822-826.
- Clark, W.S. 1984. Field identification of Accipiters in North America. *Birding* 16: 251-263.
- Clark, W.S. 1985. Migration of the Merlin along the coast of New Jersey. *J. Raptor Res.* 19: 85-91.
- Clark, W.S. 1986. What is *Buteo centralis*? Pp. 115-118 in: Chancellor & Meyburg 1986.
- Clark, W.S. 1987. The rufous morph of the Bouted Eagle. Pp. 21-27 in: Proc. 4th Int. Identification Meeting, Filat 1st-8th Nov 1986.
- Clark, W.S. 1988. Spotted Eagle with rufous nape patch. *British Birds* 83: 397-398.
- Clark, W.S. 1992. The taxonomy of Steppe and Tawny Eagles, with criteria for separation of museum specimens and live eagles. *Bull. Brit. Orn. Club* 112(3): 150-157.
- Clark, W.S. & Banks, R.C. 1992. The taxonomic status of the White-tailed Kite. *Wilson Bull.* 104: 571-579.
- Clark, W.S. & Khan, A.A. 1991. Sightings of two rare raptors, Lesser Spotted Eagle *Aquila pomarina* and Pied Harrier *Circus melanoleucos*, in Pakistan. *Forktail* 10: 175-175.
- Clark, W.S. & Parslow, R. 1991. A specimen record of Shikra *Accipiter badius* (ex Saudi Arabia). *Sandgrouse* 13: 44-46.
- Clark, W.S. & Schmitt, N.J. 1992. Flight identification of Indian raptors with pale bars on upper wings. *J. Bombay Nat. Hist. Soc.* 89: 1-3.
- Clark, W.S. & Schmitt, N.J. 1993. Field identification of the Rufous-bellied Eagle *Hieraetus kerneri*. *Forktail* 8: 7-9.
- Clark, W.S. & Schmitt, N.J. 1989. *A Field Guide to Raptors of Europe, the Middle East and North Africa*. Oxford University Press, Oxford.
- Clark, W.S. & Shurhai, H. 1995. Identification of Barbary Falcon. *Birding World* 8: 336-343.
- Clark, W.S. & Wheeler, B.K. 1987. *A Field Guide to Hawks, North America*. Houghton Mifflin Co., Boston.
- Clark, W.S. & Wheeler, B.K. 1989. Unusual roost site and staging behavior of Black-shouldered Kites. *J. Raptor Res.* 23(3): 116-117.
- Clark, W.S., Bloom, P.H. & Oliphant, L.W. 1989. Aplomado Falcon steals prey from Little Blue Heron. *J. Field Orn.* 60(3): 380-381.
- Clark, W.S., Franklin, R. & Shurhai, H. 1990. Field identification of Sooty Falcon. *British Birds* 85: 47-54.
- Clarke, R. 1983. The largest Harrier roosts in the world? *Raptor* 20: 19-21.
- Clarke, R. 1995. *The Marsh Harrier*. Hamlyn, London.
- Clarke, R., Bourgonje, A. & Castelijns, H. 1993. Food niches of sympatric Marsh Harriers *Circus aeruginosus* and Hen Harriers *C. cyaneus* on the Dutch coast in winter. *Ibis* 135(4): 424-431.
- Clay, J. 1994. Nakanai '93: an Oxford University Expedition to New Britain Island, Papua New Guinea. Unpublished report.
- Clay, W.M. 1953. Protective coloration in the American Sparrow Hawk. *Wilson Bull.* 65: 129-134.
- Clements, R. 2000. Range expansion of the Common Buzzard in Britain. *British Birds* 93: 242-248.
- Clinton-Etnier, J. 1981. King Vulture Research Report. *Vulture News* 6: 7-8.
- Clinton-Etnier, J. 1985. Notes on the relative abundance and distribution of the Lesser Yellow-headed Vulture in Mexico and Belize, Central America. *Bull. WWGBP* 2: 17-22.
- Clinton-Etnier, J. 1986. Status of the large forest eagles of Belize. Pp. 107-110 in: Chancellor & Meyburg 1986.
- Clinton-Etnier, J. 1987. The King Vulture in Costa Rica. *Vulture News* 17: 21-24.
- Clinton-Etnier, J. 1991. The Solitary Eagle *Harpyhalastur solitarius*, a new threatened species. Pp. 81-85 in: Chancellor & Meyburg 1991.
- Clinton-Etnier, J., Gartside, M.R. & Kauer, M.A. 1991. Ornate Hawk-eagle feeding on green iguana. *J. Raptor Res.* 25(1): 19-20.
- Clouet, M. 1976. La Papangue ou Busard de Maillard. *Info-Nature Ile Réunion* 14: 39-41.
- Clouet, M. 1978. Le Busard de Maillard (*Circus aeruginosus maillardi*) de l'île de la Réunion. *Oiseau et RFO* 48: 95-106.
- Clouet, M. 1981. L'Aigle royal (*Aquila chrysaetos*) dans les Pyrénées françaises. Résultats de cinq ans d'observations. *Oiseau et RFO* 51: 89-100.
- Clouet, M. 1984. Données récentes sur le statut, la démographie et les ressources des territoires de Gypaète barbu (*Gypaetus barbatus*) dans la moitié orientale des Pyrénées. Pp. 17-24 in: CRPR 1984. *Rapinsaires Méditerranéens II*. Centre de Recherche i Protecció de Rapinsaires, Barcelona, Spain.
- Clouet, M. & Barrau, C. 1993. L'Aigle Royal *Aquila chrysaetos* dans le Massif du Bale-Filhiopie. *Albula* 61: 200-201.
- Clouet, M. & Coar, J.L. 1981. Comparaison entre l'écologie de deux populations d'Aigles royaux *Aquila chrysaetos* du Midi de la France: Pyrénées et Languedoc. *Ann. Centre Rech. Orn. Provence* 1: 88-91.
- Clouet, M. & Coar, J.L. 1984. Relation morphologie-écologie entre l'Aigle royal (*Aquila chrysaetos*) et l'Aigle de Bonelli (*Hieraetus fasciatus*). *Especies sympatriques dans le Midi de la France*. Pp. 109-119 in: CRPR 1984. *Rapinsaires Méditerranéens II*. Centre de Recherche i Protecció de Rapinsaires, Barcelona, Spain.
- Clunie, F. 1972a. *Fijian Birds of Prey*. Fiji Museum, Suva.
- Clunie, F. 1972b. Sunbathing by the Fiji Goshawk. *Notorus* 19: 336.
- Clunie, F. 1972c. A contribution to the natural history of the Fiji Peregrine.

- gles in southeastern Idaho. *Auk* 101: 610-615.
- Craig, T.H. & Trout, C.H. 1979. The biology and nesting density of breeding American Kestrel and Long-eared Owls on the Big Lost River, southwestern Idaho. *Wilson Bull.* 91: 50-61.
- Cramp, S. & Simmons, K.E.L. eds. 1980. *The Birds of the Western Palearctic. Vol. 2. Hawks to Bustards.* Oxford University Press, Oxford.
- Crick, H.Q.P. & Jones, P.J. 1992. *The Ecology and Conservation of Palearctic-African Migrants.* Blackwell Scientific Publications.
- Crocoll, S.T. & Parker, J.W. 1989. The breeding biology of the Broad-winged and Red-shouldered Hawks in western New York. *J. Raptor Res.* 23: 125-139.
- Cruz, A. 1976. Food and foraging ecology of the American Kestrel in Jamaica. *Condor* 78: 409-412.
- Cruz, A. & Delannoy, C.A. 1983. Status, Breeding Biology and Conservation Needs of the Puerto Rican Sharp-shinned Hawk *Accipiter striatus ventriosus*. Rept. work elements 4B,D, and E. *US Fish Wildl. Serv. contract No. 14-164004-824047.*
- Cuello, J. & Gerzenstein, E. 1962. *Las Aves del Uruguay.* Com. Zool. Mus. Montevideo.
- Culverwell, J. 1985. A shoal of Fish Eagles. *Afr. Wildl.* 59: 218.
- Cuneo, F. 1968. Notes on breeding the King Vulture *Sarcoromphus papa* at Naples Zoo. In Danko, S. 1994b.
- Cunningham, J.D. 1955. Notes of food habits of the White-tailed Kite in southern California. *Condor* 57 (6): 571.
- Cupper, J. 1976. Interbreeding of Brown Goshawk and White Goshawk. *Austr. Bird Watcher* 6: 306-310.
- Cupper, J. 1977. Black-breasted Buzzards rearing and preying on Kestrels simultaneously. *Austr. Bird Watcher* 7: 69-73.
- Cupper, J. & Cupper, L. 1980. Nesting of the Grey Falcon *Falco hypoleucos*. *Austr. Bird Watcher* 8: 212-219.
- Cupper, J. & Cupper, L. 1981. *Hawks in Focus.* Jaclyn, Mildura, Australia.
- Currie, L., Klapste, J. & Baker-Gabb, D.J. 1993. A preliminary study of Brown Goshawks wintering at Werribee, Victoria. In: Olsen 1993a.
- Czechura, G.V. 1984a. The Peregrine Falcon (*Falco peregrinus macropus* Swainson) in south-eastern Queensland. *J. Raptor Res.* 18: 81-91.
- Czechura, G.V. 1993. The Pacific Baza *Aviceda subrestitata* in south-eastern Queensland: a review of status, natural history and conservation requirements. In: Olsen 1993a.
- Czechura, G.V. & Czechura, R.E. 1988. Interspecific conflict and an unusual display by an Australian Hobby *Falco longipennis*. *Austr. Bird Watcher* 12: 270-271.
- Czechura, G.V. & Czechura, R.E. 1994. Observations of an aerial display by Red Goshawks. *Austr. Bird Watcher* 15: 325-327.
- Czechura, G.V. & Debus, S.J.S. 1985a. The Black Falcon *Falco subniger*: a summary of information and comparison with the Brown Falcon *Falco berigora*. *Austr. Bird Watcher* 11: 80-91.
- Czechura, G.V. & Debus, S.J.S. 1985b. The Grey Falcon *Falco hypoleucos*: a summary of information and comparison with the Brown Falcon *Falco berigora*. *Austr. Bird Watcher* 11: 185-207.
- Czechura, G.V. & Debus, S.J.S. 1986. The Australian Hobby *Falco longipennis*: a review. *Austr. Bird Watcher* 11: 185-207.
- Czechura, G.V., Debus, S.J.S. & Mooney, N.J. 1987. The Collared Sparrowhawk *Accipiter cirrocephalus*: a review and comparison with the Brown Goshawk *Accipiter fasciatus*. *Austr. Bird Watcher* 12: 55-62.
- Dacink, J. 1977. Notas faunísticas y bioecológicas de Península Valdés y Patagonia. XXI. Lista sistemática y comentarios de una colección ornitológica surcordillerana (Subregión Araucana, Prov. De Rio Negro y Chubut, Argentina). *Physis (Sec. C)* 59: 201-215.
- Dalling, J. 1975. Lanners in central Salisbury: the first four years. *Honeyguide* 84: 23-26.
- Dah, G. & Eytson, S. 1996. Observations on the Square-tailed Kite in the Shalhaven district. *Austr. Birds* 29: 40-45.
- Daneel, A.B. 1965. On the eggs of the Southern Banded Harrier-eagle (*Circus fasciolatus*). *Ool. Rev.* 39: 14-15.
- Daneel, A.B. 1966a. On the range of the Southern Banded Harrier-eagle. *Ool. Rev.* 40: 73-75.
- Daneel, A.B. 1966b. In search of the pygmy falcon. *Ool. Rev.* 40: 42-50.
- Daneel, A.B. 1979. Prey size and hunting methods of the Crowned Eagle. *Ostrich* 50: 120-121.
- Daniels, B.E., Hays, L., Hays, D., Morlan, J. & Robertson, D. 1989. First record of the Common Black-hawk for California. *Western Birds* 20(1): 11-18.
- Danko, S. 1990. [The present knowledge of the Lesser Spotted Eagle (*Aquila pomarina*) in Czechoslovakia]. *Buteo* 5: 37-48. In Slovak.
- Danko, S. 1994a. Bisherige Ergebnisse der Beringung beim Kaiseradler (*Aquila heliaca*) im Nordwesten seines Brutareals. In: Meyburg & Chancellor 1994b.
- Danko, S. 1994b. The Imperial Eagle (*Aquila heliaca*) in Slovakia: History, present status, breeding success and conservation problems. In: Meyburg & Chancellor 1994b.
- Dare, P. 1961. Ecological Observations on a Breeding Population of the Common Buzzard *Buteo buteo*. PhD thesis, Exeter University.
- Darrien, C.A. & Martinez, M.M. 1984. Estudios sobre la avifauna de Corrientes. I. Nuevos registros de aves (no Passeres). *Rev. Mus. La Plata Ser. Zool.* 15(145): 257-260.
- Darwin, C. 1845. *Journal of Researches into the Natural History and Geology of Countries visited during the voyage of H.M.S. 'Beagle' round the World.* John Murray, London.
- Dathe, H. 1971. Sparrow Hawk (*Falco sparverius*) as bat hunter in Cuba. *Mitd* 5: 195-197.
- Dathe, H. & Grummt, W. 1993. A propos des apparitions d'Aigle des steppes (*Aquila rapax*) en Europe occidentale et centrale. *Aves* 26(3/4): 211.
- Daves, P. & Daves, G. 1980. Swallow-tailed Kites breeding at Port. Lake Turkana East Afr. Nat. Hist. Soc. Bull. 1980: 47-48.
- Davies, P.W. & Davis, P.E. 1973. The ecology and conservation of the Red Kite in Wales. *British Birds* 66: 183-224, 241-270.
- Davies, R. & Randall, R.M. 1989. Historical and geographical patterns in egg-shell thickness of African Fish Eagles *Haliaeetus vocifer* in relation to pesticide use within southern Africa. Pp. 501-514 in: Meyburg & Chancellor 1989.
- Davis, L.I. 1972. *A Field Guide to the Birds of Mexico and Central America.* University of Texas Press, Austin & London.
- Davis, P.E. & Davis, J.E. 1981. The food of the Red Kite in Wales. *Bird Study* 28: 30-40.
- Davis, P.E. & Newton, I. 1981. Population and breeding of red kites in Wales over a 50-year period. *J. Anim. Ecol.* 50: 759-772.
- Davis, S.E. 1989. Migration of the Mississippi Kite (*Ictinia mississippiensis*) in Bolivia, with comments on *Ictinia plumbea*. *Bull. Brit. Orn. Club* 109: 149-152.
- Davis, T.A.W. 1975. Food of the Kestrel in winter and early spring. *Bird Study* 22: 85-91.
- Davygora, A.V. 1991. Analysis of disturbance factor and its effect on the Steppe Eagle in Predural'ye. Pp. 65-67 in: *Mat. XV Vsesoyuzn. ornit. konf. Part 1, Minsk, 'Naruka i tekhnika'.*
- Davygora, A.V. 1998. Factors limiting area and numbers of Lesser Kestrel *Falco naumanni* in the South Ural steppes. *Abstracts 9th World Conference on Birds of Prey and Owls, Midrand, South Africa.*
- Davygora, A.V. & Belik, V.P. 1994. The Pallid Harrier *Circus macrourus* as an Endangered Species in the Palearctic. In: Meyburg & Chancellor 1994a.
- Dawson, J.W. & Mannan, R.W. 1991a. Dominance hierarchies and helper contributions in Harris' Hawks. *Auk* 108(3): 649-660.
- Dawson, J.W. & Mannan, R.W. 1991b. The role of territoriality in the social organization of Harris' Hawks. *Auk* 108(3): 661-672.
- Day, D. 1984. Secretary Bird (R 105) vs Tawny Eagle (R 154). *Witwatersrand Bird Club News Sheet* 124: 14.
- de Antas, T.Z. & da Silveira, C.L. 1980. Breeding the King Vulture *Sarcoromphus papa* at Rio de Janeiro Zoo. *Int. Zoo Yb.* 20: 202-204.
- de Juana, E. 1989. Situación actual de las rapaces diurnas (orden Falconiformes) en España. *Ecología* 3: 257-292.
- de Kock, A.C. & Simmons, R. 1988. Chlorinated hydrocarbon residues in African Marsh Harrier eggs and concurrent reproductive trends. *Ostrich* 59: 180-181.
- de Kock, A.C. & Watson, R.T. 1985. Organochlorine residue levels in Bateleur eggs from the Transvaal. *Ostrich* 56: 278-280.
- de la Peña, M.R. 1992. *Lista de Aves Argentinas 2nd edition. Vol. 2. Falconiformes-Charadriiformes. Literature of Latin America (L.O.L.A.).* Buenos Aires.
- de Nauriois, R. 1984. Contribution a l'ornithologie de l'archipel du Cap Vert: Reproducteurs menacés d'extinction, nicheurs occasionnels, oiseaux mentionnés par erreur. *Boletim do Museu Municipal do Funchal* 36: 38-50.
- de Rodet, F.E. 1989. The migration of raptors south of Annapurna, Nepal, autumn 1985. *Forktail* 4: 9-17.
- de Smet, K.D. & Conrad, M.P. 1991. Status, habitat requirements, and adaptations of Ferruginous Hawks in Mani-

- for Scientific Translation, Jerusalem.
- Dementiev, G.P. & Gortchakovskaya, N.N. 1945. On the biology of the Norwegian Gyrfalcon. *Ibis* 87: 559-565.
- Dementiev, G.P. & Iljitshev, V.D. 1961. Bemerkungen über die morphologie der wüsten Wanderfalken. *Falke* 8: 147-154.
- Dementiev, G.P. & Iljitshev, V.D. 1965. Die Äußere Ohr der Greifvögel. *Falke* 10: 125-125, 158-161, 187-191.
- Dendeleiche, C. 1988. Grands Rapaces et Corvidés des Montagnes d'Europe. *Acta Biologica Montana* 8 (Special Vol. 1).
- Dennis, R.H. 1983. Population studies and conservation of Ospreys in Scotland. Pp. 207-214 in: *Bird* 1983.
- Dennis, R.H., Ellis, P.M., Broad, R.A. & Langslow, D.R. 1984. The status of the Golden Eagle in Britain. *British Birds* 77: 592-607.
- Dennis, T.E. & Lashmar, A.F.C. 1986. Distribution and abundance of White-bellied Sea-eagles in South Australia. *Condor* 20: 95-102.
- Deppe, H.J. 1974. Zum Vorkommen des Steinadlers *Aquila chrysaetos* in der mitteleuropäischen Tiefebene zwischen Ems und Menet. *Die Vogelwelt* 95: 201-227.
- De Puy & Moat 1988.
- Desai, J.H. & Malhotra, A.K. 1977. Growth and development of the Pariah Kite *Milvus migrans gaurinda*. *Miss. Rep. Jamshikha Inst. Orn.* 9: 218-226.
- Desai, J.H. & Malhotra, A.K. 1979. Breeding biology of the Pariah Kite *Milvus migrans* at Delhi Zoological Park. *Ibis* 121: 320-325.
- Descouille, J.C. 1983. *Historia Natural das Aves do Brasil*. Editora Itatiaia Limitada, Belo Horizonte, Brazil.
- Dewhurst, C.F. 1986. The breeding ecology of the African Goshawk at Karen, Nairobi, Kenya. *Ostrich* 57: 1-8.
- Dewhurst, C.F. & Fishpool, J.H.C. 1984. The Swallow-tailed Kite *Chelictes vocifer* breeding in the Kerlong Valles, Kenya. *Voprosy* 8: 25-26.
- Dewhurst, C.F., Cunningham-van Someren, G.R., Allan, R.G. & Thomsett, S. 1988. Observations on the breeding biology of Ayres' Eagle *Hierosetus ayresii* at Karen, Nairobi, Kenya. *Gabari* 3: 85-93.
- Dewhurst, C.F., Cunningham-van Someren, G.R., Elliot, C.C.H., Thomsett, S. & Wilson, A.C. 1989. Some observations on the nesting habits of the Cuckoo Falcon *Accipiter cuculoides* in Kenya. *Gabari* 4: 11-15.
- Dharmakumarsinghi, K.S. & Lakshmi, K.S. 1956. [On *Haliaeetus leucogaster*]. *J. Bombay Nat. Hist. Soc.* 55: 56.
- Diamond, A.W. ed. 1987. *Studies of Mascarene Islands Birds*. Cambridge University Press, Cambridge.
- Diamond, J.M. 1971. Bird records from west New Britain. *Condor* 73: 481-483.
- Diamond, J.M. 1972. *Avifauna of the Eastern Highlands of New Guinea*. Small Ornithological Club, Cambridge, Mass.
- Diamond, J.M. 1975. Distributional ecology and habits of some Bougainville birds (Solomon Islands). *Condor* 77: 14-23.
- Diamond, J.M. 1976. Preliminary results of an ornithological exploration of the islands of Vitiaz & Dampier Straits, Papua New Guinea. *Emu* 76: 1-7.
- Diamond, J.M. 1985. New distributional records and taxa from the outlying mountain ranges of New Guinea. *Emu* 85: 65-91.
- Diamond, J.M. & LeCraw, M. 1979. Birds of Karkar and Bagabag Islands, New Guinea. *Bull. Amer. Mus. Nat. Hist.* 161: 467-531.
- Dickey, D.R. & van Rossem, A.J.V. 1958. *The Birds of El Salvador*. Field Museum of Natural History (Zoological Series) 23, Chicago.
- Dickinson, E.C. 1986. Does the Pied Harrier *Circus melanoleucos* breed in the Philippines? *Forktail* 1: 85-86.
- Dickinson, E.C., Kennedy, R.S. & Parker, K.C. 1991. *The Birds of the Philippines: An Annotated Checklist*. BOU Check-list 12. British Ornithologists' Union, Tring, Hertfordshire, UK.
- Dickinson, E.C., Kennedy, R.S., Read, D.K. & Ruzendal, F.G. 1989. Notes on birds collected in the Philippines during the Steere Expedition of 1887-1888. *Nematodes* 32: 1-19.
- Dickman, C.R., Daly, S.E.J. & Connell, G.W. 1991. Dietary relationships of the Barn Owl and Australian Kestrel on islands off the coast of Western Australia. *Emu* 91: 69-72.
- Dickson, R.C. 1988. Habitat preferences and prey of Merlins in winter. *British Birds* 81: 269-274.
- Dickson, R.C. 1991. Aerial chases by Merlins in autumn and winter. *Scottish Birds* 16: 141-142.
- Dietzen, W. 1978. Habitat selection of nesting goshawks *Accipiter gentilis* in three regions of Bavaria. *Arch. orn. Ges. Bayern* 17: 141-160.
- Dino, L.R. 1983. Observations on nesting White-tailed Hawks. *J. Raptor Res.* 17(3): 91.
- Divis, T. 1984. Number of Marsh Harrier (*Circus aeruginosus*) and its population density and dynamics in the Region of Nachud. *Zpravy Morav. Ornithol. Spoluzeni* 42: 51-65.
- Divyabhanusinh 1990. Interaction of Honey Buzzard *Pernis ptilorhynchus* with Fantail Flycatcher *Rhipidura albicollis* and Red-wattled Lapwing *Vanellus indicus*. *J. Bombay Nat. Hist. Soc.* 87 (1): 142-145.
- Dixon, J.B. 1937. The Golden Eagle in San Diego County (California). *Condor* 39: 49-56.
- Dixon, J.B., Dixon, R.E. & Dixon, J.F. 1957. Natural history of the White-tailed Kite in San Diego County, California. *Condor* 59(3): 156-165.
- Dobbs, J.C. & Benson, P.C. 1984. Calcium requirements and bone abnormalities in the Cape Vulture. Pp. 219-228 in: Mendelsohn & Sapsford, 1984.
- Dobler, E.C. 1989. Wintering Gyrfalcon *Falco rusticolus* habitat utilization in Washington. Pp. 61-70 in: Mesburg & Chancellor 1989.
- Dobler, E. 1990. Brutbintop und territorialität bei Habicht (*Accipiter gentilis*) und Rotmilan (*Milvus milvus*). *J. Orn.* 131: 85-93.
- Dobronravov, V.P. 1949. [On the biology of the Steppe Eagle in southeastern Transbaikalia]. *Izv. Irkutsk gos. n. i. protivocumn. in-ta Sibiri Dal'nego Vostoka* 7: 183-192. In Russian.
- Dodson, C.H. & Gentry, A.H. 1991. Biological extinction in western Ecuador. *Ann. Missouri Bot. Gard.* 78: 273-295.
- Dok, J.C. & Dies, N. 1987. El Halcón de Eleonor (*Falco eleonorae*, Gené) en las islas Columbretes. Pp. 241-262 in: Matilla *et al.* 1987.
- Donaghoo, W.R. 1950. Observations of some birds on Guadalcanal and Tulagi. *Condor* 52: 127-132.
- Donazar, J.A. 1993. *Los Buques Ibéricos*. Biología y Conservación. J.M. Revro Editor, Madrid.
- Donazar, J.A., Bustamante, J., Negro, J.J. & Hiraldo, F. 1994. *Estudio del cernicabo primilla en el noroeste de España: factores determinantes de la distribución y densidad de población*. Sociedad Española de Ornitología, Madrid.
- Donazar, J.A. & Ceballos, O. 1989. Growth rates of nestling Egyptian Vultures *Neophion percnopterus* in relation to brood size, hatching order and environmental factors. *Ardea* 77: 217-226.
- Donazar, J.A. & Ceballos, O. 1990. Post-fledging dependence period and development of flight and foraging behaviour in the Egyptian Vulture *Neophion percnopterus*. *Ardea* 78: 387-394.
- Donazar, J.A., Ceballos, O., Travaini, A. & Hiraldo, F. 1993a. Roadside raptor surveys in the Argentinean Patagonia. *J. Raptor Res.* 27: 106-110.
- Donazar, J.A., Elósegui, J. & Senostain, A. 1987. Apparent increase in a Gullion Vulture (*Gyps fulvus*) population in Spain. *J. Raptor Res.* 21: 75-77.
- Donazar, J.A., Negro, J.J. & Hiraldo, F. 1993b. Foraging habitat selection, land-use changes and population decline in the Lesser Kestrel *Falco naumanni*. *J. Appl. Ecol.* 30: 515-522.
- Donazar, Jose-A., Travaini, A., Ceballos, O., Rodriguez, A., Delibes, M. & Hiraldo, F. 1990. Effects of sex-associated competitive asymmetries on foraging group structure and despotic distribution in Andean condors. *Behavioural Ecology and Sociobiology* 45(1), 1989: 55-65.
- Donnas, T.J. 1990. Status, nesting and nest site selection of Cape Vultures in Lesotho. *Vulture News* 24: 11-24.
- Donnelly, B.G. 1986. The range of the Booted Eagle, *Aquila pennatus* (Gmelin), in southern Africa with a note on field identification. *Ann. Cape Prov. Mus. (Nat. Hist.)* 15: 109-115.
- Donnelly, B.G. & Irwin, M.P.S. 1972. The food of *Cypohierax angolensis*. *Bull. Brit. Orn. Club* 92: 22.
- Dooling, R.J. 1982. Auditory perception in birds. In: Kruvinski, D. & Miller, F. (eds), *Acoustic Communication in Birds* 1. New York.
- Douthwaite, R.J. 1992. Effects of DDT on the Fish Eagle *Haliaeetus vocifer* population of Lake Kariba in Zimbabwe. *Ibis* 134: 250-258.
- Dowsett, R.J. 1983. Breeding and other observations on the Lata Falcon *Falco fasciatus*. *Ibis* 125: 362-366.
- Dowsett, R.J. & Dowsett-Lemaire, F. 1980. The systematic status of some Zambian birds. *Geofaut* 70: 151-199.
- Drabheim, G. 1993. Breeding biology of the White Hawk in Guatemala. *J. Raptor Res.* 27(1): 68.
- Drabheim, G.S. & Barrera, O.A.A. 1992. Breeding biology of the White Hawk. Pp. 153-161 in: Whitacre & Thorstom 1992.
- Drabheim, G.S., Córdoba, A.E.H. & Aguirre, O. 1991. Observations on the White Hawk (*Leucopternis albicollis*). Pp. 77-82 in: Whitacre *et al.* 1991.
- Drobnik, E. 1994. On the biology of the Lesser Spotted Eagle *Aquila pomarina* in Lithuania. In: Mesburg & Chancellor 1994b.

- Evans, D.L. & Rosenfield, R.N. 1985. Migration and mortality of Sharp-shinned Hawks ringed at Duluth, Minnesota, USA. Pp. 311-316 in: Newton & Chancellor 1985.
- Evans, I.M. & Pienkowski, M.W. 1991. World status of the Red Kite. A background to the experimental reintroduction to England and Scotland. *British Birds* 84: 171-187.
- Eve, R. & Gungue, A.M. 1982. Birds on Ko Libong, Southern Thailand. *Nat. Hist. Bull. Siam Soc.* 30: 91-104.
- Everett, M.J. 1975. *Birds of Prey*. Orbis, London.
- Everett, W.T., Ward, M.L. & Brettingham, J.J. 1989. Birds observed in the central Bering Sea pack ice in February and March 1985. *Geofaut* 79: 159-166.
- Ev, A. 1984. Notes on Letter-winged Kites breeding in western Queensland, 1972-83. *Aust. Bird Watcher* 10: 243-247.
- Faaborg, J. 1984. Potential for restocking Galapagos Hawks on islands where they have been extirpated. *Notulae de Galapagos* 39: 28-30.
- Faaborg, J. 1986. Reproductive success and survivorship of the Galapagos Hawk *Buteo galapagoensis*. Potential costs and benefits of cooperative polyandry. *Ibis* 128(3): 337-347.
- Faaborg, J., de Vries T.J., Paterson, C.B. & Griffin, C.R. 1980. Preliminary observations on the occurrence and evolution of polyandry in the Galapagos Hawk (*Buteo galapagoensis*). *Auk* 97(5): 581-590.
- Faaborg, J., Parker, P.G., DeLay, L., De Vries, T.J., Bednatz, J.C., Paz, S., Narango, J. & Waite, I.A. 1995. Confirmation of cooperative polyandry in the Galapagos Hawk *Buteo galapagoensis*. *Behav. Ecol. Sociobiol.* 36: 83-90.
- Falandysz, J., Jakuczun, B. & Mizera, T. 1988. Metals and organochlorines in four female White-tailed Eagles. *Marine Pollution Bull.* 19 (10): 521-526.
- Falkenberg, I.D., Dennis, J.F. & Williams, B.D. 1994. Organochlorine pesticide contamination in three species of raptors and their prey in South Australia. *Wildlife Research* 21: 163-175.
- Falsa, G.A., Ukraim, D.J. & Whitacre, D.F. 1977. The status and ecology of the Bat Falcon. 1977 meeting of Raptor Research Foundation, Tempe, Arizona.
- Fatall, U. 1994. Breeding Biology, Habitat Selection and Conservation of Montagu's Harrier *Circus pygmaeus* in the Northern Apennines, Italy. In: Meyburg & Chancellor 1994a.
- Farquhar, C.C. 1986. Ecology and Breeding Behavior of the White-tailed Hawk on the Northern Coastal Prairies of Texas. PhD dissertation, Texas A & M University, College Station.
- Farquhar, C.C. 1988. Ecology and breeding behavior of the White-tailed Hawk. Pp. 306-315 in: Gliński *et al.* 1988.
- Farquhar, C.C. 1992. White-tailed Hawk. No. 30 in: Poole *et al.* 1992.
- Farquhar, C.C. 1993. Individual and intersexual variation in alarm calls of the White-tailed Hawk. *Condor* 95(1): 234-239.
- Fasce, P. & Fasce, L. 1984. *L'Aquila Reale in Italia*. Ecologia e Conservazione. Lega Italiana Protezione Uccelli. Serie Scientifica, Parma, Italia.
- Fasce, P., Fasce, L. & Torre, J. 1989. Census and observations on the biology of the Bearded Vulture (*Gypspetus barbatus*) on Corsica. Pp. 335-340 in: Meyburg & Chancellor 1989.
- Faust, R. 1964. Geburt und Tod eines Kuttengriets. *Zool. Garten* 218: 250-260.
- Favaloro, N.J. 1944. The White-breasted Sea-eagle along the Murray Valley. *Emu* 43: 233-242.
- Feare, C.J., Temple, S.A. & Procter, J. 1974. The status, distribution and diet of the Seychelles Kestrel *Falco araea*. *Ibis* 116: 548-551.
- Feduccia, A. & Voorheis, M. 1989. Miocene hawk converges on Secretarybird. *Ibis* 131: 349-354.
- Fennell, C.M. 1965. Stomach analyses of Korean birds. *Mis. Rept. Yamashina Inst. Orn. Zool.* 4: 172-183.
- Fenton, M.B., Cumming, D.H.M. & Oules, D.J. 1978. Prey of Bat Hawks and availability of bats. *Condor* 79: 495-497.
- Fenzlöff, C. 1989. Sanford expedition 1989. *World Working Group on Birds of Prey Newsl.* 11: 5-9.
- Fenzlöff, C. 1990. Sanford expedition (II). *World Working Group on Birds of Prey Newsl.* 12: 3-5.
- Fenzlöff, C. & Minne Mann, D. 1994. The reintroduction of Sea Eagles *Haliaeetus albicilla* in former breeding areas in Czechoslovakia and Ireland. In: Meyburg & Chancellor 1994a.
- Ferguson-Lees, J.J. 1951. The Peregrine population of Britain, parts I and II. *Bird Notes* 21: 202-208, 309-314.
- Ferguson-Lees, J.J. 1972. Kestrels nesting close together. *New Birds* 65: 257-258.
- Ferguson-Lees, J. & Faull, F. 1992. *Endangered Birds*. George Philip, London.
- Fernández, C. 1988. El Águila real (*Aquila chrysaetos*) en Navarra. Utilización del Espacio, Biología de la Reproducción y Ecología Trófica. PhD thesis, Universidad de León, Spain.
- Fernández, C. 1991. Variation climale du régime alimentaire et de la reproduction chez l'Éagle. *Rev. Écol. (Terr. Vie)* 40: 363-371.
- Fernández, C. & León, J. 1985. La alimentación del águila real (*Aquila chrysaetos* L.) en Navarra. *Revista Príncipe de Viana* 5: 227-242.
- Ferrari, S.F. 1990. A foraging association between two kite species (*Elanus plumbeus* and *Leptodon cayanensis*) and bull-headed marmosets (*Callithrix flaviceps*) in southeastern Brazil. *Condor* 92(5): 781-783.
- Ferrer, M. 1992. Regulation of the period of postfledging dependence in the Spanish Imperial Eagle *Aquila adalberti*. *Ibis* 134: 128-133.
- Ferrer, M. 1993a. El Águila Imperial Quercus, Madrid.
- Ferrer, M. 1993b. Juvenile dispersal behaviour and natal philopatry of a long-lived raptor, the Spanish Imperial Eagle *Aquila adalberti*. *Ibis* 135: 132-138.
- Ferrer, M. & Calderón, J. 1980. The Spanish Imperial Eagle *Aquila adalberti* in Doñana National Park: a study of population dynamics. *Hum. Conserv.* 5: 151-161.
- Ferrer, M. & Hiraldo, F. 1991. Evaluation of management techniques for the Spanish Imperial Eagle. *Wildl. Soc. Bull.* 19(4): 436-442.
- Ferrero, J.J., Negro, J.J. & Román, J.A. 1986. Distribución y censo del Águila Real (*Aquila chrysaetos*) y Águila Perdicera (*Hieraaetus fasciatus*) en Extremadura (España W). *Ayles* 4: 79-84.
- Fevold, H.R. & Craighead, J.J. 1958. Food requirement of the Golden Eagle. *Auk* 75: 312-317.
- French-Constant, P. 1985. Entanglement of a Secretarybird in telephone wires. *Bonerguide* 51: 51-52.
- French, R. 1973. *A Guide to the Birds of Trinidad and Tobago*. Livingston Publishing Company, Wynnewood, Pennsylvania.
- French, R. 1982. The breeding of the Pearl Kite in Trinidad. *Living Bird* 19: 121-132.
- French, R. 1985. Changes in the Avifauna of Trinidad. Pp. 986-991 in: Buckley *et al.* 1985.
- French, R. 1992. *A Guide to the Birds of Trinidad and Tobago*. 2nd edition. Christopher Helm, London (published in 1991 in USA by Cornell University Press).
- Fiedler, P. 1982. Food habits of Bald Eagles along the mid-Columbia River, Washington. *Murrelet* 63: 46-50.
- Fily, M. & Perennou, C. 1990. Red Kite *Mihus milvus*, new record in Ladakh (India). *J. Bombay Nat. Hist. Soc.* 87(2): 291.
- Finch, B.W. 1978. Observations and notes on the Bat Hawk *Micchaerampus alpinus* in Papua. *Papua New Guinea Bird Society Newsl.* 14(1): 8-12.
- Finch, B.W. & McKean, J.I. 1987. Some notes on the birds of the Bismarck [sic] Marsh 2: 3-28.
- Finch, B.W. 1981. Description of immature Doria's Hawk *Megatriorchis doriae*. *Papua New Guinea Bird Soc. Newsl.* 17(3-17): 9-10.
- Finch-Davies, C.G. & Kemp, A.C. 1980. *The Birds of Prey of Southern Africa*. Winchester Press, Johannesburg.
- Finley, W.L. 1908-1910. Life history of the California Condor. *Condor* 8: 135-142, 10: 5-10, 59-65, 12: 5-11.
- Furtha, I. 1976. The White-tailed Eagle (*Haliaeetus albicilla*) in Hortobágy. *Aquila* 83: 243-250.
- Fischer, A.K. 1893. The hawks and owls of the United States in their relation to agriculture. *Bull. U.S. Dept. Agric. Div. Ornith. Mamm.* 3: 1-210.
- Fischer, D.L. 1984. Successful breeding of a pair of Sharp-shinned Hawks in immature plumage. *J. Raptor Res.* 18: 135-136.
- Fischer, W. 1970. *Die Scaudler*. A. Ziemsen Verlag, Wittenberg Lutherstadt.
- Fischer, W. 1971. *Die Geier*. A. Ziemsen Verlag, Wittenberg Lutherstadt.
- Fischer, W. 1983a. *Die Habichte*. A. Ziemsen Verlag, Wittenberg Lutherstadt.
- Fischer, W. 1983b. Kuttengriet (*Accipiter monachus*). Haltung und Zucht im Tierpark Berlin. *World Working Group on Birds of Prey Bull.* 1: 185-186.
- Fitch, H.S. 1965. Observations on the Mississippi Kite in southwestern Kansas. *Univ. Kansas Publ. Mus. Nat. Hist.* 12: 503-519.
- Fitch, H.S., Swenson, F. & Tillotson, D.F. 1946. Behavior and food habits of the Red-tailed Hawk. *Condor* 48: 205-257.
- Fitzner, R.E. 1980. Behavioral Ecology of the Swainson's Hawk (*Buteo swainsoni*) in Washington. *Pattelle Pacific NW Lab. Tech. Rep. No. PNL-2754*, Richland Wash. 65 pp.
- Finczyski, D. 1978. Zur Populationsökologie des Baumfalke (*Falco subbuteo* L., 1758). *Zool. Jb. Syst.* 64: 105: 193-257.

- Symposium, 21 November 1986. Wild Bird Society of Japan, Tokyo.
- Fuller, M.R., Bystrak, D., Robbins, C.S. & Patterson, R.M. 1987. Trends in American Kestrel counts from North American breeding bird survey. Pp. 22-27 in: Bird & Bowman 1987.
- Fulop, Z. & Szilka, L. 1988. Contribution to the food biology of the Red-footed Falcon (*Falco tinnunculus*). *Aquila* 95: 174-181.
- Fulton, H.T. 1904. Some notes on the birds of Chitral. *J. Bombay Nat. Hist. Soc.* 16: 144-64.
- Funes, S.H., Avila, J.L. & Avila, G.L. 1992. Reproductive biology, food habits, and behavior of the Black Hawk-eagle in Tikal National Park. Pp. 173-178 in: Whitacre & Thorstrom 1992.
- Furness, R.W. 1987. *The Skuas*. I. & A.D. Poyser, Calton.
- Fyfe, R.W. & Ohendorf, R.R. 1976. Minimizing the dangers of nesting studies to raptors and other sensitive species. *Can. Wildl. Serv. Occas. Pap.* 23: 1-17.
- Fyfe, R.W., Campbell, J., Hayson, B. & Hodson, K. 1969. Regional population declines and organochlorine insecticides in Canadian Prairie Falcons. *Can. Field-Nat.* 83: 191-200.
- Fyfe, R.W., Risebrough, R.W., Monk, J.G., Jarman, W.J., Anderson, D.W. & Hill, I. 1988. DDE, productivity, and eggshell thickness relationships in the genus *Falco*. Pp. 519-535 in: Cade *et al.* 1988.
- Galley, J. & Bolwig, N. 1975. Observations on the behaviour of the Andean Condor *Vultur gryphus*. *Condor* 75: 60-68.
- Galbraith, I.C.J. & Galbraith, I.H. 1962. Land birds of Guadalcanal and the San Cristobal group, Eastern Solomon Islands. *Bull. Brit. Mus. (Nat. Hist.)* 9: 1-86.
- Galetti, M., Martuscelli, P., Pizo, M.A. & Simão, I. 1997. Records of Harpy and Crested Eagles in the Brazilian Atlantic forest. *Bull. Brit. Orn. Club* 117: 27-31.
- Gallagher, M.D. & Woodcock, M.W. 1980. *The Birds of Oman*. Quartet Books, London.
- Gallardo, J. 1986. Observations on *Elanus leucurus leucurus* Vieillot (Aves: Accipitridae). *Comun. Mus. Argent. Cienc. Nat. Bernardino Rivadavia, Inst. Nat. Invest. Cienc. Nat. Zool.* 4(15): 121-126.
- Galushin, V.M. 1962. [The Greater Spotted Eagle in the valley of the Oka river and its influence on the numbers of some birds]. *Uch. zapiski Moskov. pedagog. inst. im. Levina* 18(6): 115-151. In Russian.
- Galushin, V.M. 1971. A huge urban population of birds of prey in Delhi, India. *Ibis* 113: 522.
- Galushin, V.M., Kostin, A.B., Moseikin, V.N., Generozov, A.V., Matvey, I.L. & Reif, V.E. 1996. The Levant Sparrowhawk and other raptors of the Middle Volga River. *Ibis* 138: 149-150.
- Gamauf, A., Preleuthner, M. & Winkler, H. 1998a. Philippine birds of prey: interrelations among habitat, morphology and behavior. *Auk* 115: 715-726.
- Gamauf, A., Preleuthner, M. & Pinsker, W. 1998b. Distribution and field identification of Philippine birds of prey. I. Philippine Hawk Eagle *Spizartus philippensis* and Changeable Hawk Eagle *Spizartus cirrhatus*. *Forktail* 14: 1-11.
- Garber, C.S., Mutch, B.D. & Platt, S. 1995. Observations of wintering Gyrfalcons (*Falco rusticolus*) hunting Sage Grouse (*Centrocercus urophasianus*) in Wyoming and Montana, USA. *J. Raptor Res.* 27: 169-171.
- Garcelon, D.K. & Roemer, G.W. 1988. *Proceedings of the International Symposium on Raptor Reintroduction*, 1985. Institute for Wildlife Studies, Arcata.
- Gard, S.W. & Bird, D.M. 1990. Breeding behavior of American Kestrels raising manipulated brood sizes in years of varying prey abundance. *Wilson Bull.* 102: 605-614.
- Gargett, V. 1968. Two Wahlberg's Eagle chicks - a one in forty-eight chance. *Honeyguide* 54: 26-28.
- Gargett, V. 1971. Some observations on Black Eagles *Aquila verreauxi* in the Matopos, Rhodesia. *Ostrich* 9 (Suppl.): 91-124.
- Gargett, V. 1972. Black Eagle *Aquila verreauxi* population dynamics. *Ostrich* 43: 177-178.
- Gargett, V. 1972a.
- Gargett, V. 1975. The spawning of Black Eagles in the Matopos, Rhodesia. *Ostrich* 46: 1-44.
- Gargett, V. 1978a. Black Eagles in protected and unprotected habitats. Pp. 96-103 in Kemp, 1978.
- Gargett, V. 1978b. Sibling aggression in the Black Eagle in the Matopos, Rhodesia. *Ostrich* 49: 57-63.
- Gargett, V. 1984. The activities and behaviour of Black Eagle pairs in the Matopos, Zimbabwe. Pp. 689-706 in: Ledger 1984.
- Gargett, V. 1990. *The Black Eagle*. Acorn Books & Russel Friedman, Johannesburg.
- Gargett, V. & Gargett, F. 1993. Hard times for the Matopo Black Eagles. *Honeyguide* 39: 7-15.
- Garnett, S. 1987. An Australian record of Gurney's Eagle *Aquila gurneyi*. *Aust. Bird Watcher* 12: 134-135.
- Garnett, S. 1992. Threatened and Extinct Birds of Australia. *BAOJ Report* 82. Royal Australasian Ornithologists' Union, Melbourne.
- Garnett, S., Lown, R. & Tully, D. 1994. Feeding behaviour of a Square-tailed Kite *Lophoinctes isura*. *Aust. Bird Watcher* 15: 280-281.
- Garrido, O.H. 1985. Cuban endangered birds. Pp. 992-999 in: Buckley *et al.* 1985.
- Garrido, O.H. & Montaña, F.G. 1975. *Catálogo de las Aves de Cuba*. Academia de Ciencias de Cuba, La Habana.
- Garstone, R. 1986. Little Eagle *Hieraaetus amphainoides* takes Banded Fruit-Dove *Ptilinopus rufus*. *Aust. Bird Watcher* 11: 242-243.
- Garrón, J., González, I.M., González, J.L. & Hiraldo, F. 1984. Situación actual y problemática del Aguila Imperial Ibérica (*Aquila adalberti*). Pp. 70-80 in: CRPR 1984 *Rapinares Mediterráneos II*. Centre de Recerca i Protecció de Rapinares, Barcelona, Spain.
- Gates, J.M. 1972. Red-tailed Hawk populations and ecology in east central Wisconsin. *Wilson Bull.* 84: 421-453.
- Gatter, W. 1988. The Birds of Liberia: A Preliminary Checklist with Status and Open Questions. *Verh. orn. Ges. Bayern* 24: 689-725.
- Gaucher, P., Daumicht, W.D. & Eichaker, X. 1994. The Sooty Falcon in Saudi Arabia. In: Meyburg & Chancellor 1994a.
- Gaucher, P., Petit, T. & Simens, P. 1988. Notes on the study of the Sooty Falcon (*Falco concolor*) in Saudi Arabia. *Alanda* 56(5): 277-283.
- Gaulden, R.L. 1993. Suburban Settlers. Harris' Hawks and people live harmoniously in the Southwest. *Breder's World* 7(6): 36-40.
- Gaymer, R. 1967. Observations on the birds of Aldabra in 1964 and 1965. *Atoll Res. Bull.* 118: 113-125.
- Gaymer, R., Blackman, R.A.A., Dawson, P.G., Penny, M. & Penny, C.M. 1969. The endemic birds of Seychelles. *Ibis* 111: 157-176.
- Geer, J.A. 1978. Factors affecting the delivery of prey to nestling Sparrowhawks (*Accipiter nisus*). *J. Zool., London* 195: 71-80.
- Gejlikman, B.O. 1959. [Ecology of some birds of prey in the reserve 'Khutov forest']. *Zool. Sber. Zool. Inst. Akad. Nauk Armen SSR* 11: 3-64. In Russian.
- Geidenhuys, J.N. 1984. Status of the Fish Eagle and Goliath Heron in the Orange Free State, South Africa. Pp. 577-587 in: Ledger 1984.
- Genelly, R.F. 1978. Observations of the Australian Kestrel on Northern Tablelands of New South Wales, 1975. *Emu* 78: 137-144.
- Genetti, F. 1985. Indagine sulla presenza del Grifone, *Gyps fulvus*, sulle Alpi orientali. *Riv. ital. Orn.* 55(3-4): 113-126.
- Gennaro, A.L. 1988. Breeding biology of an urban population of Mississippi Kite. Pp. 188-190 in: Głinski *et al.* 1988.
- Geñshol, B. 1986. *Collins Photo Guide to the Birds of Prey of Britain and Europe, North Africa and the Middle East*. Collins, London.
- Geñshol, B. 1995. *Rovfuglene i Europa, Nordafrika og Mellemøsten*. Gads Forlag, Denmark.
- Genz, K. 1965. Am Horst des Scheideletts. *Falke* 12: 412-420.
- Genz, K. 1967. [On the breeding biology of the Lesser Spotted Eagle]. *Ornitologia* 8: 294-298. In Russian.
- Gerhardt, D.M., Vásquez-Marroquín, M.A. & Gerhardt, R.P. 1990. Swallow-tailed Kite (*Elanoides forficatus*). Pp. 121-127 in: Burnham *et al.* 1990.
- Gerhardt, R.P., Harris, P.M. & Vásquez-Marroquín, M.A. 1992. Observations and food habits of nesting Great Black Hawks in Tikal National Park, Guatemala. *J. Raptor Res.* 27(1): 70.
- Gerhardt, R.P., Harris, P.M. & Vásquez-Marroquín, M.A. 1993. Food habits of nesting Great Black Hawks in Tikal National Park, Guatemala. *Biotropica* 25(5): 349-352.
- Gerhardt, R.P., Vásquez-Marroquín, M.A. & Gerhardt, D.M. 1991. Breeding biology, food habits, and sibsicide of Swallow-tailed Kites (*Elanoides forficatus*). Pp. 65-71 in: Whitacre *et al.* 1991.
- Genoudet, P. & Grubler, W. 1967. A propos du nombre des Vautours moines à Majouque. *Nos Oiseaux* 29: 97-99.
- Gerrard, J.M. & Bortolotti, G.R. 1988. *The Bald Eagle: Haunts and Habits of a Wilderness Monarch*. Smithsonian Institution Press, Washington, D.C.
- Gerrard, J.M., Gerrard, P.N., Bortolotti, R.R. & Dzus, E.H. 1992. A 24-year study of Bald Eagles on Bernard Lake, Saskatchewan. *J. Raptor Res.* 26: 159-166.
- Gerrard, P., Gerrard, J.M., Whitfield, D.W.A. & Maher, W.J. 1974. Post-fledging movements of juvenile Bald Eagles. *Blue Jay* 32: 218-226.
- Giacchini, P. & Pandolfi, M. 1994. Feeding Habits of Montagu's Harrier *Circus*

- Editions Cardinalis, Noumea, New Caledonia.
- Hansen, A.J. 1987. Regulation of Bald Eagle reproductive rates in southeast Alaska. *Ecology* 68: 1587-1592.
- Hansen, A.J. & Hodges, J.L. 1985. High rates of nonbreeding adult Bald Eagles in southeastern Alaska. *J. Wildl. Manage.* 49: 454-458.
- Hantge, E. 1968. Zum beutewerb unserer Wanderfalken. *Orn. Mit.* 20: 211-217.
- Harasathy, L. & Bagyura, J. 1993. A comparison of the nesting habits of the Red-footed Falcon in colonies and solitary pairs. Pp. 80-85 in: Nicholls & Clarke 1993.
- Harasathy, L., Bagyura, J. & Szitta, T. 1994a. Zur Biologie des Schreiadlers *Aquila pomarina* in Ungarn. In: Meyburg & Chancellor 1994b.
- Harasathy, L., Bagyura, J. & Szitta, T. 1994b. Zum Kainismus des Schreiadlers *Aquila pomarina* und seiner Verhinderung. In: Meyburg & Chancellor 1994b.
- Harasathy, L., Bagyura, J., Szitta, T., Petrosits, Z. & Viszló, L. 1994. Biology, Status and Conservation of the Imperial Eagle (*Aquila heliaca*) in Hungary. In: Meyburg & Chancellor 1994b.
- Hárd, I. & Enemár, A. 1980. Sienfalkern, *Falco columbarius* bytval och matning under ungarnas höst. *Vår Fågelvärld* 1980: 25-34.
- Hardy, J.W., Raitt, R.J., Orejuela, J., Webber, T. & Edinger, B. 1975. First observation of the Orange-breasted Falcon in the Yucatan Peninsula of Mexico. *Condor* 77(4): 512.
- Hardy, R. 1999. Nesting habits of the western Red-tailed Hawk. *Condor* 41: 79-80.
- Harmata, A.R. & Stahldecker, D.W. 1993. Fidelity of migrant Bald Eagles to wintering grounds in southern Colorado and northern New Mexico. *J. Field Orn.* 64: 129-134.
- Harmata, A.R., Ineplert, J.E. & Gerrard, J.M. 1985. Fall migration of Bald Eagles produced in northern Saskatchewan. *Blue Jay* 43: 232-237.
- Harris, M.P. 1982. *A Field Guide to the Birds of Galapagos*. Collins, London.
- Harris, P.M., Gerhardt, R.P. & Vásquez, M.A. 1991. Observations and food habits of nesting Great Black Hawks (*Buteogallus urubitinga ulguris* Gurney). Pp. 83-91 in: Whitacre et al. 1991.
- Harris, T., Dunning, J. & Hoets, D. 1980. The darker side of Bat Hawks. *Birding in SA* 42: 86-90.
- Harrison, C.J.O. 1985. Abnormal plumage. In: Campbell & Lack 1985.
- Harrison, C.J.O. & Frith, C.B. 1970. Nests and eggs of some New Guinea birds. *Emu* 70: 173-178.
- Harrison, E.N. & Kiff, L.F. 1977. The nest and egg of the Black Solitary Eagle. *Condor* 79(1): 132-133.
- Harrison, J. 1999. *A field guide to the birds of Sri Lanka*. Oxford: Oxford University Press, Oxford.
- Harrison, J.A. Allan, D.G., Underhill, I.G., Herremans, M., Tice, A.J., Parker, V. & Brown, C.J. (eds) 1997. *The atlas of southern African birds, 1. Non-passerines*. BirdLife South Africa: Johannesburg.
- Harrison, J.G. 1955. The first occurrence of the Bateleur and Red Kite in Iraq. *Bull. Brit. Orn. Club* 75: 60-61.
- Harrison, T.H. 1968. Birds above the Borneo jungle canopy. *Ibis* 105: 403-406.
- Hart, J. 1977. Observations on the breeding of the Black Sparrowhawk *Accipiter melanoleucus* in Zaire. *Ostrich* 48: 43-46.
- Hartert, E. 1910. The birds of Hainan. *Novitates Zool.* 17: 189-254. Hartet, E. 1914.
- Hartley, R. 1976. Some notes on the plumage of the Black Sparrowhawk. *Bokmakerru* 28: 61-63.
- Hartley, R. 1982. Notes on Ayres' Hawk Eagle in the Mutare area. *Honeyguide* 110: 25-27.
- Hartley, R. 1988. More on the Mutare Bat Hawks. *Honeyguide* 54: 121-122.
- Hartley, R. 1991. Notes on the juvenile plumage of the Taita Falcon and breeding conditions of an immature bird. *Ostrich* 62: 73-74.
- Hartley, R. 1992. Kori Bustard and Secretarybird electrocuted. *Honeyguide* 57: 179.
- Hartley, R. 1993. The Batoka Gorges, haven for birds of prey. *Afr. Wildl.* 47: 74-77.
- Hartley, R. & Heinrich, W. 1992. Notes on the juvenile plumage of the Taita Falcon. *Ostrich* 62: 73-74.
- Hartley, R. & Hustler, K. 1993. A less-than-annual breeding cycle in a pair of African Bat-Hawks *Macheiramphus olivaceus*. *Ibis* 135(4): 456-458.
- Hartley, R., Dunkley, A.S., Groenewald, A. & Bodington, G. 1993. Notes on the breeding biology, hunting behaviour and ecology of the Taita Falcon *Falco fasciatus* in Zimbabwe. Pp. 121-122 in: Wilson 1993.
- Harvey, W.G. 1990. *Birds in Bangladesh*. University Press, Dhaka.
- Harwood, M. ed. 1975. *Proceedings of the North American Hawk Migration Conference, 1974*. Hawk Migration Association of North America, Washington, Connecticut, USA.
- Havenlever, H., Kostrewa, A. & Kostrewa, R. 1989. The breeding biology of the Kestrel *Falco tinnunculus* in eastern Westphalia, 1972-87. *J. Orn.* 129: 229-237.
- Hatch, D.E. 1970. Energy conserving and heat dissipating mechanisms of the Turkey Vulture. *Auk* 87: 111-124.
- Haucke, H.H. 1971. Predation by a White-tailed Hawk and a Harris' Hawk on a Wild Turkey poult. *Condor* 73: 475.
- Hauff, P. 1998. Bestandsentwicklung des Seeadlers *Haliaeetus albicilla* in Deutschland seit 1980 mit einem Rückblick auf vergangenen 100 Jahre. *Vogelwelt* 119: 47-63.
- Haukioja, E. & Haukioja, M. 1970. Mortality rates of Finnish and Swedish Goshawks (*Accipiter gentilis*). *Finnish Game Res.* 31: 15-20.
- Haverschmidt, F. 1947. The Black Vulture and the Caracara as vegetarians. *Condor* 49(4): 210.
- Haverschmidt, F. 1954. Evening flights of the Southern Everglades Kite and Blue and Yellow Macaw in Surinam. *Wilson Bull.* 66(4): 264-265.
- Haverschmidt, F. 1955. Notes on some Surinam breeding birds. *Ardea* 43: 137-144.
- Haverschmidt, F. 1957. Bird records from Surinam (III). *Ardea* 45: 84-89.
- Haverschmidt, F. 1959a. *Elanus leucurus* breeding in Surinam. *Auk* 76: 526.
- Haverschmidt, F. 1959b. *Elanus leucurus* breeding in Surinam. *Auk* 76: 32-36.
- Haverschmidt, F. 1959c. Notes on *Heterocolistes hamatus* in Surinam. *Auk* 76: 32-36.
- Haverschmidt, F. 1962. Notes on the feeding habits and food of some hawks in Surinam. *Condor* 64: 154-158.
- Haverschmidt, F. 1964. Beobachtungen an *Chondrohierax uncinatus* (Temminck) in Surinam. *J. Orn., Leipzig* 105: 64-66.
- Haverschmidt, F. 1968. *Birds of Surinam*. Oliver and Boyd, Edinburgh & London.
- Haverschmidt, F. 1970. Notes on the Snail Kite in Surinam. *Auk* 87: 580-584.
- Haverschmidt, F. 1972. *Accipiter palangaster* in Surinam. *J. Orn.* 115: 338-339.
- Haverschmidt, F. 1980. *Falco deivoleucus* Temminck in Surinam. *J. Orn.* 104: 443-445.
- Hawbecker, A.C. 1940. The nesting of the White-tailed Kite in southern Santa Cruz County, California. *Condor* 42: 108-111.
- Hawbecker, A.C. 1942. A life history study of the White-tailed Kite. *Condor* 44(6): 267-276.
- Hayes, F.E. 1991. Raptor densities along the Paraguay River: Seasonal, geographical and time of day variation. *J. Raptor Res.* 25(4): 101-108.
- Hays, C. 1971. Essai sur la biologie de reproduction du Busard-cendré (*Circus pygargus*) dans le Morbihan. *Ar. Vron* 4: 1-15.
- Hayward, K.J. 1967. Fauna del noroeste argentino, 1. Las aves de Guavaya (La Rioja). *Acta Zool. Lilloana* 22: 211-220.
- Hazevoet, C.J. 1995. *The Birds of the Cape Verde Islands. An annotated Check-list*. BOU Checklist No. 15. Tring, UK.
- Hazevoet, C.J. 1997. Conservation and species lists: taxonomic neglect promotes the extinction of endemic birds, as exemplified by taxa from eastern Atlantic islands. *Bird Conserv. Internat.* 6: 181-196.
- Hazevoet, C.J. 1999a. Notes on birds from the Cape Verde Islands in the collection of the Centro de Zoologia, Lisbon, with comments on taxonomy and distribution. *Bull. Brit. Orn. Club* 119: 25-32.
- Hazevoet, C.J. 1999b. Fourth report on birds from the Cape Verde Islands, including notes on conservation and records of 11 new taxa to the archipelago. *Bull. Zool. Mus. Univ. Amsterdam* 17: 19-32.
- Heck, H. 1963. The successful breeding of the King Vulture *Sarcoramphus papa* in captivity. *Zool. Garten* 27: 295-297.
- Heck, H. 1971. The artificial and hand-rearing of a King Vulture *Sarcoramphus papa* at Catskill Game Farm. *Zool. Garten* 41: 45-48.
- Hector, D.P. 1980. Our rare falcon of the desert grassland. *Birding* 12(3): 93-102.
- Hector, D.P. 1981. The Habitat, Diet, and Foraging Behavior of the Aplomado Falcon, *Falco femoralis* (Temminck). MSc dissertation, Oklahoma St. University, Stillwater, USA.
- Hector, D.P. 1985. The diet of the Aplomado Falcon (*Falco femoralis*) in eastern Mexico. *Condor* 87(3): 336-342.
- Hector, D.P. 1986. Cooperative hunting and its relationship to foraging success and prey size in an avian predator. *Ethology* 73(3): 247-257.
- Hector, D.P. 1987. The decline of the Aplomado Falcon in the United States. *Amer. Birds* 41(3): 381-389.
- Hedley, L.A. 1976. Some observations of a communal roost of the Australasian Harrier. *Natornis* 23: 85-89.
- Hedley, L.A. & Hedley, S. 1982. Falcons breeding in the western King Country. *Natornis* 29: 214.
- Heim de Balsac, H. & Mavaud, N. 1962.

- Symposium, 21 November 1986. Wild Bird Society of Japan, Tokyo.
- Fuller, M.R., Bystrak, D., Robbins, C.S. & Patterson, R.M. 1987. Trends in American Kestrel counts from North American breeding bird survey. Pp. 22-27 in: Bird & Bowman 1987.
- Fulop, Z. & Schyka, I. 1988. Contribution to the food biology of the Red-footed Falcon (*Falco tinnunculus*). *Aquila* 95: 174-181.
- Fulton, H.T. 1904. Some notes on the birds of Chitral. *J. Bombay Nat. Hist. Soc.* 16: 144-64.
- Funes, S.H., Avila, J.L. & Avila, G.L. 1992. Reproductive biology, food habits, and behavior of the Black Hawk-eagle in Tikal National Park. Pp. 175-178 in: Whitacre & Thorstrom 1992.
- Furness, R.W. 1987. *The Skuas*. T & A.D. Poyser, Cañon.
- Fyfe, R.W. & Olendorf, R.R. 1976. Minimizing the dangers of nesting studies to raptors and other sensitive species. *Can. Wildl. Serv. Occas. Pap.* 23: 1-17.
- Fyfe, R.W., Campbell, J., Havson, B. & Hodson, K. 1969. Regional population declines and organochlorine insecticides in Canadian Prairie Falcons. *Can. Field-Nat.* 83: 191-200.
- Fyfe, R.W., Riechrough, R.W., Monk, J.G., Jaiman, W.J., Anderson, D.W. & Kill, I. 1988. DDE, productivity, and eggshell thickness relationships in the genus *Falco*. Pp. 319-355 in: Cade *et al.* 1988.
- Gailey, J. & Helwig, S. 1973. Observations on the behaviour of the Andean Condor *Vultur gryphus*. *Condor* 75: 60-68.
- Galbraith, I.C.J. & Galbraith, E.H. 1962. Land birds of Guadalcanal and the San Cristobal group, Eastern Solomon Islands. *Bull. Brit. Mus. (Nat. Hist.)* 9: 1-86.
- Galetti, M., Matuscelli, P., Pizo, M.A. & Simão, I. 1997. Records of Harpy and Crested Eagles in the Brazilian Atlantic forest. *Bull. Brit. Orn. Club* 117: 27-31.
- Gallagher, M.D. & Woodcock, M.W. 1980. *The Birds of Oman*. Quarter Books, London.
- Gallardo, J. 1986. Observations on *Elanus leucurus leucurus* Vieillot (Aves: Accipitridae). *Comun. Mus. Argent. Cienc. Nat. Bernardino Rivadavia, Inst. Nac. Invest. Cienc. Nat. Zool.* 4(15): 121-126.
- Galushin, V.M. 1962. [The Greater Spotted Eagle in the valley of the Oka river and its influence on the numbers of some birds]. *Verh. zapiski Moskov. perlag. inst. im Leninga* 186: 115-151. In Russian.
- Galushin, V.M. 1971. A huge urban population of birds of prey in Delhi, India. *Ibis* 113: 522.
- Galushin, V.M., Kostin, A.B., Moseikin, V.N., Generozov, A.V., Mareev, H., & Reif, V.E. 1996. The Levant Sparrowhawk and other raptors of the Middle Volga River. *Ibis* 138: 149-150.
- Gamauf, A., Preleuthner, M. & Winkler, H. 1998a. Philippine birds of prey: interrelations among habitat, morphology and behavior. *Auk* 115: 715-726.
- Gamauf, A., Preleuthner, M. & Pilsner, W. 1998b. Distribution and field identification of Philippine birds of prey: 1. Philippine Hawk Eagle *Spyaetus philippensis* and Changeable Hawk Eagle *Spyaetus cirrhatus*. *Forktail* 14: 1-11.
- Garber, C.S., Mutch, B.D. & Platt, S. 1993. Observations of wintering Gyrfalcons (*Falco rusticolus*) hunting Sage Grouse (*Centrocercus urophasianus*) in Wyoming and Montana, USA. *J. Raptor Res.* 27: 169-171.
- Garcelon, D.A. & Roemer, G.W. 1988. *Proceedings of the International Symposium on Raptor Reintroduction*, 1985. Institute for Wildlife Studies, Arizata.
- Gard, N.W. & Bird, D.M. 1990. Breeding behavior of American Kestrels raising manipulated brood sizes in years of varying prey abundance. *Wilson Bull.* 102: 605-614.
- Gargett, V. 1968. Two Wahlberg's Eagle chicks - a one in forty-eight chance. *Honeyguide* 51: 26-28.
- Gargett, V. 1971. Some observations on Black Eagles *Aquila verreauxi* in the Matopos, Rhodesia. *Ostrich* 9 (Suppl.): 91-124.
- Gargett, V. 1972. Black Eagle *Aquila verreauxi* population dynamics. *Ostrich* 43: 177-178.
- Gargett, V. 1972a.
- Gargett, V. 1973. The spacing of Black Eagles in the Matopos, Rhodesia. *Ostrich* 46: 1-44.
- Gargett, V. 1978a. Black Eagles in protected and unprotected habitats. Pp. 96-103 in: Kemp, 1978.
- Gargett, V. 1978b. Sibling aggression in the Black Eagle in the Matopos, Rhodesia. *Ostrich* 49: 57-63.
- Gargett, V. 1984. The activities and behaviour of Black Eagle pairs in the Matopos, Zimbabwe. Pp. 689-706 in: Ledger 1984.
- Gargett, V. 1990. *The Black Eagle*. Acorn Books & Russel Friedman, Johannesburg.
- Gargett, V. & Gargett, E. 1995. Hard times for the Matopo Black Eagles. *Honeyguide* 39: 7-15.
- Garnett, S. 1987. An Australian record of Gurney's Eagle *Aquila gurneyi*. *Austr. Bird Watcher* 12: 134-135.
- Garnett, S. 1992. Threatened and Extinct Birds of Australia. *RACB Report* 82. Royal Australasian Ornithologists' Union, Melbourne.
- Garnett, S., Lown, R. & Tully, D. 1994. Feeding behaviour of a Squate-tailed Kite *Lophoactinia isura*. *Austr. Bird Watcher* 15: 294-281.
- Garrido, O.H. 1985. Cuban endangered birds. Pp. 992-999 in: Buckley *et al.* 1985.
- Garrido, O.H. & Montaña, F.G. 1975. *Catálogo de las Aves de Cuba*. Academia de Ciencias de Cuba, La Habana.
- Garstone, R. 1996. Little Eagle *Hieraetus morphnoides* takes Banded Fruit-Dove *Ptilinopus caratus*. *Austr. Bird Watcher* 11: 242-243.
- Garcón, J., González, L.M., González, J.I. & Hiraldo, F. 1984. Situación actual y problemática del Aguila Imperial Iberica (*Aquila adalberti*). Pp. 70-80 in: CRPR 1984. *Rapinsaires Méditerranés II*. Centre de Recerca i Protecció de Rapinsaires, Barcelona, Spain.
- Gates, J.M. 1972. Red-tailed Hawk populations and ecology in east central Wisconsin. *Wilson Bull.* 84: 421-433.
- Gatter, W. 1988. The Birds of Liberia: A Preliminary Checklist with Status and Open Questions. *Verh. orn. Ges. Bayern* 24: 689-723.
- Gaucher, P., Daunicht, W.D. & Eschaker, X. 1994. The Sooty Falcon in Saudi Arabia. In: Meyburg & Chancellor 1994a.
- Gaucher, P., Petit, T. & Simens, P. 1990. Notes on the study of the Sooty Falcon (*Falco concolor*) in Saudi Arabia. *Alauda* 56(3): 277-283.
- Gaulden, R.I. 1993. Suburban Settlers: Harris' Hawks and people live harmoniously in the Southwest. *Border's World* 7(6): 36-40.
- Gaymer, R. 1967. Observations on the birds of Aldabra in 1964 and 1965. *Atoll Res. Bull.* 118: 115-125.
- Gaymer, R., Blackman, R.A.A., Dawson, P.G., Penny, M. & Penny, C.M. 1969. The endemic birds of Seychelles. *Ibis* 111: 157-176.
- Geer, J.A. 1978. Factors affecting the delivery of prey to nestling Sparrowhawks (*Accipiter nisus*). *J. Zool., London* 195: 71-80.
- Gelijikman, B.G. 1959. [Ecology of some birds of prey in the reserve 'Khorov forest']. *Zool. Zhur. Zool. Inst. Akad. Nauk Armen SSR* 11: 5-61. In Russian.
- Geldenhuys, J.N. 1984. Status of the Fish Eagle and Goshawk Heron in the Orange Free State, South Africa. Pp. 577-587 in: Ledger 1984.
- Genelly, R.E. 1978. Observations of the Australian Kestrel on Northern Tablelands of New South Wales, 1975. *Emu* 78: 137-144.
- Genero, F. 1985. Indagine sulla presenza del Grifone, *Gyps fulvus*, sulle Alpi orientali. *Riv. Ital. Orn.* 55(3-4): 113-126.
- Gennato, A.I. 1988. Breeding biology of an urban population of Mississippi Kite. Pp. 188-190 in: Glinski *et al.* 1988.
- Gensbol, B. 1986. *Collins Photo Guide to the Birds of Prey of Britain and Europe, North Africa and the Middle East*. Collins, London.
- Gensbol, B. 1995. *Hovfuglene i Europa, Nordafrika og Mellemøsten*. Gads Forlag, Denmark.
- Gentz, K. 1965. Am Huest der Schwadler. *Falke* 12: 412-420.
- Gentz, K. 1967. [On the breeding biology of the Lesser Spotted Eagle]. *Ornitologia* 8: 294-298. In Russian.
- Gerhardt, D.M., Vásquez-Marroquín, M.A. & Gerhardt, R.P. 1990. Swallow-tailed Kite (*Elinoides forficatus*). Pp. 121-127 in: Burnham *et al.* 1990.
- Gerhardt, R.P., Harris, P.M. & Vázquez-Marroquín, M.A. 1992. Observations and food habits of nesting Great Black Hawks in Tikal National Park, Guatemala. *J. Raptor Res.* 27(1): 70.
- Gerhardt, R.P., Harris, P.M. & Vázquez-Marroquín, M.A. 1993. Food habits of nesting Great Black Hawks in Tikal National Park, Guatemala. *Biotropica* 25(3): 349-352.
- Gerhardt, R.P., Vázquez-Marroquín, M.A. & Gerhardt, D.M. 1991. Breeding biology, food habits, and sibilicide of Swallow-tailed Kites (*Elinoides forficatus*). Pp. 65-71 in: Whitacre *et al.* 1991.
- Geroudet, P. & Grubler, W. 1967. A propos du nombre des Vautours moines a Majorque. *Nos Oiseaux* 20: 97-99.
- Gerrard, J.M. & Bortolotti, G.R. 1988. *The Bald Eagle. Haunts and Habits of a Wilderness Monarch*. Smithsonian Institution Press, Washington, D.C.
- Gerrard, J.M., Gerrard, P.N., Bortolotti, R.R. & Dous, E.H. 1992. A 24-year study of Bald Eagles on Bernard Lake, Saskatchewan. *J. Raptor Res.* 26: 159-166.
- Gerrard, P., Gerrard, J.M., Whitfield, D.W.A. & Maher, W.J. 1974. Post-fledging movements of juvenile Bald Eagles. *Blue Jay* 32: 218-226.
- Giacchini, P. & Pandolfi, M. 1994. Feeding Habits of Montagu's Harrier. *Circus*

- pygargus* in Central Italy. In: Meyburg & Chancellor 1994a.
- Glai, A.G. 1951. Notas sobre la avifauna de Saha y Misiones. *Hornero* 9: 247-276.
- Gibbons, D.W. 1993. *The New Atlas of Breeding Birds in Britain and Ireland*. Poyser, Calton, England.
- Gibbs, R.G. & Gibbs, K. 1975. Observations at a Gray Hawk's nest. *J. Trinidad & Tobago Field Nat. Club* 2:5.
- Gilliard, E.T. 1950a. Notes on a collection of birds from Bataan, Luzon, Philippine Islands. *Bull. Amer. Mus. Nat. Hist.* 94: 76.
- Gilliard, E.T. 1950b. Notes on the birds of southeastern Papua. *Amer. Mus. Novit.* no. 1453.
- Gilliard, E.T. & LeCroy, M. 1966. Birds of the middle Sepik region, New Guinea. Results of the American Museum of Natural History expedition to New Guinea, 1953-1954. *Bull. Amer. Mus. Nat. Hist.* 132: 247-275.
- Gilliard, E.T. & LeCroy, M. 1967a. Annotated list of birds of the Adelbert Mountains, New Guinea. *Bull. Amer. Mus. Nat. Hist.* 138: 53-81.
- Gilliard, E.T. & LeCroy, M. 1967b. Results of the 1958-1959 Gilliard New Britain expedition. 4. An annotated list of the birds of Whiteman Mountains, New Britain. *Bull. Amer. Mus. Nat. Hist.* 135: 175-216.
- Gilmer, D.S. & Stewart, R.F. 1981. Swainson's Hawk nesting ecology in North Dakota. *Condor* 83: 12-18.
- Ginn, P.J., McIllester, W.G. & Milstein, P.L.S. 1989. *The Complete Book of Southern African Birds*. Struik Publishers, Cape Town.
- Giraud-Audouin, M. & Pineau, J. 1971. Nidification du Buzard des roseaux (*Circus aeruginosus harterti*) en milieu nonaquatique dans la région de Tanger. *Alauda* 42: 281-288.
- Giraudoux, P., Degauquier, R., Jones, P.J., Weigel, J. & Benmann, P. 1988. Avifaune du Niger, état des connaissances en 1986. *Motacilla* 10: 1-140.
- Gjersthaug, J.O. 1996. Breeding success and productivity of the Golden Eagle *Aquila chrysaetos* in central Norway 1970-1990. Pp. 175-184 in Meyburg & Chancellor, 1996.
- Glazener, W.C. 1964. Note on the feeding habits of the Caracara in south Texas. *Condor* 66(1): 162.
- Glinski, R.L. 1982. The Red-shouldered Hawk (*Buteo lineatus*) in Arizona. *Amer. Birds* 36: 801-803.
- Glinski, R.L. & Gennaro, A.L. 1988. Mississippi Kite. Pp. 54-56 in Glinski et al. 1988.
- Glinski, R.L. & Ohmart, R.D. 1985. Breeding ecology of the Mississippi Kite. *Condor* 85: 200-207.
- Glinski, R.L., Pendleton, B.C., Moss, M.B., LeFranc, M.N., Millsap, B.A. & Hoffman, S.W. eds. 1988. *Proceedings of the Southwest Raptor Management Symposium and Workshop*. National Wildlife Federation Science Technical Series 11, Washington, D.C.
- Glotov, I.N. 1979. [Materials on the biology of the Greater Spotted Eagle (*Aquila clanga* Pall.)]. *Trudy Biol. Inst. Sub. Akad. Nauk SSSR (Novosibirsk)* 5: 167-170. In Russian.
- Glutz von Blotzheim, U.N., Bauer, K.M. & Bezzel, E. eds. 1971. *Handbuch der Vögel Mitteleuropas*. Vol. 4. *Falconiformes*. Akademische Verlagsgesellschaft, Frankfurt am Main.
- Glutz von Blotzheim, U.N., Bauer, K.M. & Bezzel, E. eds. 1975. *Handbuch der Vögel Mitteleuropas*. Vol. 5. Akademische Verlagsgesellschaft, Frankfurt am Main.
- Glynn, W.F. 1995. Bat Hawk (*Macheiramphus alcinus*) sighting from Kobakma, Irian Jaya, Indonesia on 8<sup>th</sup> December 1990. *Moruk* 7: 122-123.
- Gochfeld, M., Kleinbaum, M. & Tudor, G. 1978. Observations on behavior and vocalizations of a pair of wild Harpy Eagles. *Auk* 95(1): 192-194.
- Goethe, F. 1989. [Immature White-tailed Eagle (*Haliaeetus albucilla*) feeds on Herring Gull chicks for 3 weeks on Meemmet (West Germany)]. *Drosera* 89(1-2): 63-66. In German with English summary.
- Golodushko, B.Z. 1958. [On food of the Common Buzzard (*Buteo buteo* L.) and the Lesser Spotted Eagle (*Aquila pomarina* Brehm) in the Bialowieza Forest reserve]. *Trudy Zapevno-ochotnitskogo khozjajstva Belorusskaja Pusts* 1: 100-109. In Russian.
- Golodushko, B.Z. 1959. [Data on the ecology of the Lesser Spotted Eagle in the Bialowieza Forest]. Pp. 34-35 in: *Tezisy dokladov 1-oj zool. konf. Belorusskoj SSR*. Minsk. In Russian.
- Golodushko, B.Z. 1961. [Numbers of amphibians and reptilians and their role in nutrition of the Common Buzzard and the Lesser Spotted Eagle in the Bialowieza Forest reserve]. Pp. 143-149 in: *Fauna i ekologiya nazemnykh pozvonochnykh Belorussia*. In Russian.
- Gonnet, J.M. & Blendinger, P.G. 1990. Nuevos registros de distribución del Aguila Coronada (*Harpyhaliaetus coronatus*) en el oeste de Argentina. *Hornero* 15: 99-102.
- Gonzales, R.B. 1968. A study of the breeding biology and ecology of the Monkey-eating Eagle. *Silliman J.* 15: 338-342.
- González, G., Santiago, J.M. & Fernández, I. 1992. El Aguila Pescadora *Pandion haliaetus* en España. ICONA, Madrid.
- González, J.L. 1991. El Aguilucho laguneto *Circus aeruginosus* (L., 1748) en España. Situación, Biología de la Reproducción, Alimentación y Conservación. ICONA & CSIC, Madrid.
- González, J.L. & Merino, M. 1991. El Cernicalo Primilla (*Falco naumanni*) en la Península Ibérica. Situación, Problemática y Aspectos Biológicos. ICONA, Madrid.
- González, L.M. 1990. Situación de las poblaciones de Aguila Imperial y Buitre Negro en España. *Quercus* 58: 16-22.
- González, L.M. 1990. Aves en la Lista Roja: El Aguila Imperial. *La Gacilla* 79: 14-17.
- González, L.M. 1991a. Historia Natural del Aguila Imperial Ibérica (*Aquila adalberti* Brehm, 1861). Taxonomía, Población, Análisis de la Distribución Geográfica, Alimentación, Reproducción y Conservación. ICONA, Colección Técnica, Madrid.
- González, L.M. 1991b. Censo de las poblaciones reproductoras de Aguila Imperial y Buitre Negro en España. *Quercus* 58: 16-22.
- González, L.M. & Grande, J.L. 1991. *El Mundo del Aguila Imperial Ibérica*. Madrid.
- González, L.M. & Hiraldo, F. 1987. Organochlorine and heavy metals contamination in the eggs of the Spanish Imperial Eagle (*Aquila adalberti*) and accompanying changes in eggshell morphology and chemistry. *Environm. Pollut.* 51: 241-258.
- González, L.M., Alonso, J.C., González, J.L. & Heredia, B. 1985. Estudios sobre la reproducción del Aguila Imperial Ibérica (*Aquila adalberti*). Monografía ICONA 36.
- González, L.M., Bustamante, J. & Hiraldo, F. 1990. Factors influencing the present distribution of the Spanish Imperial Eagle (*Aquila adalberti*). *Biol. Conserv.* 51: 311-319.
- González, L.M., González, J.L., Garrón, J. & Heredia, B. 1987. Censo y distribución del Aguila Imperial Ibérica (*Aquila adalberti*) en España durante el periodo 1981-1986. *Bot. Estac. Centr. Ecol.* 31: 98-109.
- González, L.M., Heredia, B., González, J.L. & Alonso, J.C. 1989a. Juvenile dispersal of the Spanish Imperial Eagle (*Aquila adalberti*). *J. Field Orn.* 60: 369-379.
- González, L.M., Hiraldo, F., Delibes, M. & Calderón, J. 1989b. Reduction in the range of the Spanish Imperial Eagle (*Aquila adalberti*) since AD 1850. *J. Biogeogr.* 16: 305-315.
- González, L.M., Hiraldo, F., Delibes, M. & Calderón, J. 1989c. Zoogeographic support to consider the Spanish Imperial Eagle as a distinct species. *Bull. Brit. Orn. Club* 109: 86-93.
- González, P.C. 1985. Birds of the Caturthanes. *Zool. Pap. Nat. Mus. Manila* 2.
- Gouldall, J.D., Johnson, A.W. & Phillipi, R.A. 1957. *Las Aves de Chile*. Vol. 2. Plant Establecimientos Gráficos, Buenos Aires.
- Goodman, S.M. & González, P.C. 1990. The birds of Mt Isarog National Park, southern Luzon, Philippines with particular reference to altitudinal distribution. *Fieldiana* 60: 1-39.
- Goodman, S.M. & Haynes, C.V. 1989. The distribution, breeding season, and food habits of the Lanner from the eastern Sahara. *Natl. Geog. Res.* 5: 126-131.
- Goodman, S.M. & Haynes, C.V. 1992. The diet of the Lanner (*Falco biarmicus*) in a hyper-arid region of the eastern Sahara. *J. Arid Environm.* 22: 93-98.
- Goodman, S.M. & Pilgerson, M. 1991. Madagascar Harrier Hawk *Polyboroides radiatus* preying on flying fox *Pteropus rufus*. *Ornith* 62: 215-216.
- Goodman, S.M., Meininger, P.L., Baha El Din, S.M., Hobbs, J.J. & Mullie, W.C. 1989. *The Birds of Egypt*. Oxford University Press, Oxford & New York.
- Goshan, I. 1994. Lesser and Greater Spotted Eagle *Aquila pomarina* and *Aquila clanga* in Ukraine. In: Meyburg & Chancellor 1994b.
- Gordon, S.I. 1955. *The Golden Eagle: King of Birds*. Melvet Press, Perth, UK.
- Gore, M.E.J. 1990. *Birds of Gambia. IOC/ Checklist 3*. 2nd. revised edition. British Ornithologists' Union, Tring, UK.
- Gore, M.E.J. & Gepp, A.R.M. 1978. *Las Aves del Uruguay*. Mosca House, Montevideo.
- Gore, M.E.J. & Woon, P.O. 1971. *The Birds of Korea*. Royal Asiatic Society, Seoul.
- Gosper, D.G. 1994. Breeding of the Swamp Harrier on the NSW north coast. *Aust. Birds* 27: 151.
- Goszczyński, J. & Pilatowski, T. 1986. Diet of Common Buzzard (*Buteo buteo* L.) and Goshawk (*Accipiter gentilis*) in the nesting period. *Ekologia Polska* 34(4): 655-667.

- Les Oiseaux du Nord-ouest de l'Afrique*. Paul Lechevalier, Paris.
- Heinrich, G. 1956. Biologische Aufzeichnungen über Vögel von Halmahera und Batjan. *Journ. Orn.* 97: 31-40.
- Heintzelman, D.S. 1975. *The Migrations of Hawks*. Indiana University Press, Bloomington, Indiana, USA.
- Heintzelman, D.L. 1975. Autumn Hawk Flights: The Migrations in Eastern North America. Rutgers University Press, New Brunswick, New Jersey.
- Heintzelman, D.S. 1964. Spring and summer Sparrow Hawk food habits. *Wilson Bull.* 76: 323-330.
- Heintzelman, D.S. 1979. *A Guide to Hawk Watching in North America*. Pennsylvania State Univ. Press.
- Helander, B. 1975. *Havsörnen i Sverige*. Bokusläningen, Uddevalla, Sweden. Svenska Naturskyddsföreningen.
- Helander, B. 1983. Reproduction of the White-tailed Sea Eagle *Haliaeetus albicilla* (L.) in Sweden, in Relation to Food and Residue Levels of Organochlorine and Mercury Compounds in the Eggs. University of Stockholm and Swedish Society for the Conservation of Nature, Stockholm.
- Helander, B. 1990a. Sea Eagle (*Haliaeetus albicilla*) workshop. Pp. 128-135 in Vikane & Vilks 1990.
- Helander, B. 1990b. The international colour-ringing programme for White-tailed Sea Eagles (*Haliaeetus albicilla* L.). Pp. 136-153 in Vikane & Vilks, 1990.
- Helbig, A.J., Seibold, I., Bednarek, W., Gaucher, P., Ristow, D., Scharlau, W., Schmidt, D. & Wink, M. 1994. Phylogenetic relationships among falcon species (genus *Falco*) according to DNA sequence variation of the cytochrome b gene. In: Meyburg & Chancellor 1994a.
- Hellebrekers, W.P.J. & Hoogerwerf, A. 1967. A further contribution to our zoological knowledge of the island of Java (Indonesia). *Zool. Verh. Rijksmus. Nat. Hist. Leiden* 88: 1-164.
- Hellmayr, C.E. 1932. *The Birds of Chile*. Publications of the Field Museum of Natural History (Zoological Series) 19. Chicago.
- Hellmayr, C.E. & Conover, B. 1949. *Catalogue of Birds of the Americas and Adjacent Islands*. Publications of the Field Museum of Natural History (Zoological Series) 13 pt. 164. Chicago.
- Hendry, M. 1960. Call of the Secretary Bird. *J. East Afr. Nat. Hist. Soc.* 25: 217.
- Henny, C.J. 1983. Distribution and abundance of nesting Ospreys in the USA. Pp. 175-186 in: Bird 1983.
- Henny, C.J. & Anneat, J.T. 1978. A White-tailed Kite breeding record for Oregon. *Western Birds* 9: 131-133.
- Henny, C.J. & Kaiser, T.F. 1979. Organochlorine and mercury residues in Swainson's Hawk eggs from the Pacific Northwest. *Murrelet* 60: 2-5.
- Henny, C.J. & Wight, H.M. 1969. An endangered Osprey population: estimates of mortality and production. *Auk* 86: 188-198.
- Henny, C.J. & Wight, H.M. 1972. Population ecology and environmental pollution: Red-tailed and Cooper's Hawks. Pp. 229-250 in: *Population Ecology of Migratory Birds: a Symposium*. US Fish Wildlife Service Research Report 2. Washington, D.C.
- Henny, C.J., Olson, R.A. & Fleming, T.I. 1985. Breeding chronology, molt, and measurements of Accipiter hawks in Northeastern Oregon. *J. Field Orn.* 56: 97-112.
- Henny, C.J., Schmid, F.C., Mattau, E.M. & Houd, L.L. 1973. Territorial behavior, pesticides, and the population ecology of Red-shouldered Hawks in central Maryland, 1943-1971. *Ecology* 54: 545-554.
- Henry, G.M. 1998. *A Guide to the Birds of Sri Lanka*. 3rd edition. Oxford University Press, Delhi.
- Henschel, J.R., Mendelsohn, J.M. & Simmons, R. 1991. Is the association between the Gahar Goshawks and social spiders *Stegodyphus* mutualism or theft? *Gahar* 6: 57-60.
- Heredia, B. 1995. *Action plan for the Cinereous Vulture*. BirdLife International. Council of Europe, Cambridge/Strasbourg.
- Heredia, B. 1996. International action plan for the Imperial Eagle (*Aquila heliaca*). Pp. 159-174 in B. Heredia, L. Rose and M. Painter, eds. *Globally threatened birds in Europe: action plans*. Strasbourg: Council of Europe, and BirdLife International.
- Heredia, B. & Clark, W.S. 1984. Kleptoparasitism by White-tailed Hawk (*Buteo albicaudatus*) on Black-shouldered Kite (*Elanus caeruleus leucurus*) in southern Texas. *J. Raptor Res.* 18: 30-31.
- Heredia, B., Alonso, J.C. & Hiraldo, F. 1991. Space and habitat use by Red Kites *Milvus milvus* during winter in the Guadalquivir marshes: a comparison between resident and wintering populations. *Ibis* 133: 374-381.
- Heredia, B., González, I.M., González, J.I. & Alonso, J.C. 1985. La emancipación y dispersión de los jóvenes de *Aquila Imperial* en el Parque Nacional de Doñana. *Vida Silvestre* 53: 36-43.
- Heredia, R. & Donazar, J.A. 1990. High frequency of polyandrous traw in an endangered population of Lammergeiers *Cypaetus barbatus* in northern Spain. *Biol. Conserv.* 53(5): 163-171.
- Heredia, R. & Heredia, B. eds. 1991. El Quebrantahuesos (*Cypaetus barbatus*) en los Pirineos. Características Ecológicas y Biología de la Conservación. ICONA, Colección Técnica, Madrid.
- Heredia, B., Rose, L. & Painter, M. (eds). 1996. *Globally Threatened Birds in Europe: action plans*. Council of Europe, Strasbourg, and BirdLife International.
- Herholdt, J.J. 1994. Aspects of the breeding ecology of the Red-necked Falcon *Falco chicquera-horsburghi* and its hunting association with the Gahar Goshawk *Micronisus gahar* in the South-eastern Kalahari. In: Meyburg & Chancellor 1994a.
- Herholdt, J.J. & de Villiers, D.J. 1989. Interesting bird observations in the Kalahari Gemsbok National Park 1988. *Mitsra* 6: 13-18.
- Herholdt, J.J. & de Villiers, D.J. 1991. Breeding success and population density of the Bateleur *Terathopius ecaudatus* in the Kalahari Gemsbok National Park. *Gahar* 6: 3-6.
- Herklots, G.A.C. 1961. *The Birds of Trinidad and Tobago*. Collins, London.
- Herman, T.B. & Herdstron, I. 1990. The Orange-breasted Falcon (*Falco deiroleucus*) in Costa Rica gone for thirty years? *Bonasia* 34: 153-154.
- Hero, J.M., Lima, A. & Joseph, L. 1992. Greater Yellow-headed Vultures feeding on a three-toed sloth in Amazonian rainforest. *Hornero* 13: 285.
- Herremans, M. 1990. Trends in the evolution of insular land birds, exemplified by the Comoro, Seychelles and Mascarene Islands. Pp. 249-260 in: *Vertebrates in the tropics*. Museum Alexander Koenig, Bonn.
- Heymann, E.W. 1992. Associations of tamarins (*Saguinus mystax* and *Saguinus fuscicollis*) and Double-toothed Kites (*Harpagus bidentatus*) in Peruvian Amazonia. *Folia Primatol.* 59(1): 51-55.
- Hickey, J.J. 1969. *Peregrine Falcon Populations. Their Biology and Decline*. University of Wisconsin Press, Madison, Wisconsin, USA.
- Hilden, O. & Kalinainen, P. 1966. Über Vorkommen und Biologie der Rohrwehe, *Circus aeruginosus* (L.), in Finland. *Ornis Scand.* 43: 85-124.
- Hill, S.P. 1944. Sexual Dimorphism in the Falconiformes. *Auk* 61: 228-234.
- Hillena, B., Krul, G.O. & Wallace, D.I.M. 1998. Species new to the Western Palearctic. *BWP Update* 2: 137-141.
- Hille, S. 1998. Zur Situation der Milane *Milvus milvus fasciatus* (Hartert, 1914) und *Milvus m. migrans* (Boddaert, 1783) auf den Kapverdischen Inseln. *J. Orn.* 139: 73-75.
- Hille, S. & Thiollay, J.-M. In press. The imminent extinction of the Kites *Milvus milvus fasciatus* and *Milvus m. migrans* on the Cape Verde Islands. *Bird Conservation International*.
- Hille, S. & Winkler, H. 2000. Ecomorphology of island populations of the Kestrel *Falco tinnunculus* on Cape Verde. Pp. 729-736 in Chancellor & Meyburg, 2000.
- Hilly, S.L. & Brown, W.L. 1996. *A Guide to the Birds of Colombia*. Princeton University Press, Princeton, New Jersey.
- Hines, C.J.H. 1987. The birds of Eastern Kavango, SWA: Namibia. *J. South West Afr. Soc.* 40: 41, 115-147.
- Hines, C.J.H. & Raats, W. 1989. Notes on the distribution and diet of the African Fish Eagle in north-east Namibia. *Gahar* 4: 7-10.
- Hinton, F. 1940. (Notes on the ecology of Steppe Eagles (*Aquila nipalensis orientalis* Gab.)). *Rev. Microb. Epidém. Saratov, USSR* 19: 322-331. In Russian.
- Hiraldo, F. 1974. Colonias de cría y censo de los Buites Negros (*Aegypius monachus*) en España. *Naturalia Hispanica* 2: 1-31.
- Hiraldo, F. 1976. Diet of the Black Vulture (*Aegypius monachus*) in the Iberian Peninsula. *Doñana Acta Vertebrata* 3: 19-31.
- Hiraldo, F. 1983. Breeding biology of the Cinereous Vulture. Pp. 197-213 in: Wilbur & Jackson 1983.
- Hiraldo, F., Negro, J.J. & Donazar, J.A. 1991. Aborted polygyny in the Lesser Kestrel *Falco naumanni* (Aves, Falconidae). *Ethology* 89: 253-257.
- Hiraldo, F., Negro, J.J., Donazar, J.A. & Gaona, P. 1996. A demographic model for a population of the endangered Lesser Kestrel in southern Spain. *J. Appl. Ecol.*
- Hiraldo, F., Delibes, M. & Calderón, J. 1976. Sobre el status taxonómico del *Aguila Imperial Ibérica*. *Doñana Acta Vertebrata* 3: 171-182.
- Hiraldo, F., Delibes, M. & Calderón, J. 1979. El Quebrantahuesos *Cypaetus barbatus* (L.). Sistemática, Taxonomía,

- Vultures *Gyps rueppellii* in the Serengeti in response to changes in ungulate populations. *Ibis* 132: 36-41.
- Houston, D.C. 1993. The incidence of healed fractures to wing bones of White-backed and Rüppell's Griffon Vultures *Gyps africanus* and *G. rueppellii* and other birds. *Ibis* 135(4): 468.
- Houston, D.C. 1994. Observations on Greater Yellow-headed Vultures *Cathartes melambrotus* and other *Cathartes* species as scavengers in forest in Venezuela. In: Meyburg & Chancellor 1994a.
- Houston, D.C., Hall, A. & Frey, H. 1995. The characteristics of the cosmetic soils used by Bearded Vultures *Gypaetus barbatus*. *Bull. Brit. Orn. Club* 113(4): 260-263.
- Howard, R.P. & Hilliard, M. 1980. Artificial nest structures and grassland raptors. *J. Raptor Res.* 14: 41-45.
- Howard, R.P. & Wolfe, M.L. 1976. Range improvement practices and Ferruginous Hawks. *J. Range Manage.* 29: 33-37.
- Howe, W. 1989. Differences in coloration in Black Hattier young. *Bee-eater* 40: 53-55.
- Howell, S.N.G. & Webb, S. 1992. New and noteworthy bird records from Guatemala and Honduras. *Bull. Brit. Orn. Club* 112: 42-49.
- Howell, S.N.G. & Webb, S. 1993. *A Guide to the Birds of Mexico and Northern Central America*. Oxford University Press, Oxford.
- Howell, S.N.G. & Webb, S. 1995. Noteworthy bird observations from Chile. *Bull. Brit. Orn. Club* 115: 57-66.
- Howell, S.N.G. & Whitaker, A. 1993. Field identification of Orange-breasted and Rufous Falcons. *Colinva* 4: 36-43.
- Howell, T.R. 1971. An ecological study of birds of the lowland pine savanna and adjacent rain forest in northeastern Nicaragua. *Living Bird* 10: 185-242.
- Howell, T.R. 1972. Birds of the lowland pine savanna of northeastern Nicaragua. *Condor* 74(3): 316-340.
- Howells, W.W. & Husler, C.W. 1984. The status and breeding success of eagles and vultures in the Hwange National Park, Zimbabwe. Pp. 99-107 in: Mendelsohn & Napstord (Weds), 1984.
- Howland, L.A. 1988. Observations on the Dark Chanting Goshawk. *Honeyguide* 31: 178-181.
- Hubbard, J.P. 1974. The status of the Gray Hawk in New Mexico. *Auk* 91: 163-166.
- Hubert, C. 1993. Nest site habitat selected by Common Buzzard (*Buteo buteo*) in southwestern France. *J. Raptor Res.* 27: 102-105.
- Hûe, F. & Eichéopar, R.D. 1970. *Les Oiseaux du Proche et du Moyen Orient*. Editions N. Boube & Cie, Paris.
- Hughes, P. & Hughes, B. 1984. Notes on territorial defence and nest building behaviour of Wedge-tailed Eagles. *Aust. Bird Watcher* 10: 166-167.
- Hull, C. 1986. The diet of the Wedge-tailed Eagle, *Aquila audax*, breeding near Melbourne. *Condor* 10: 21-24.
- Hull, C. 1991. A comparison of the morphology of the feeding apparatus in the Peregrine Falcon, *Falco peregrinus*, and the Brown Falcon, *F. berigora* (Falconiformes). *Aust. J. Zool.* 39: 67-76.
- Hull, C. 1993. Prey dismantling techniques of the Peregrine Falcon *Falco peregrinus* and Brown Falcon *Falco berigora*: their relevance to optimal foraging theory. In: Olsen 1993a.
- Hummel, D. 1980. The aerodynamic characteristics of slotted wing-tips in soaring birds. *Int. Orn. Congr.* 17: 391-396.
- Humphreys, P.S., Bridge, D., Reynolds, P.W. & Peterson, R.T. 1970. *Birds of Isla Grande (Tierra del Fuego)*. Museum of Natural History, University of Kansas, Lawrence, Kansas.
- Humphreys, P.S., Péfaur, J.E. & Rasmussen, P.C. 1993. Avifauna of three holocene cave deposits in southern Chile. *Oec. Pap. Mus. Nat. Hist. Univ. Kansas* 154: 1-57.
- Humphreys, S.R. & Bain, J.R. 1990. *Endangered Animals of Thailand*. Sandhill Crane Press, Gainesville, Florida.
- Hunt, C. 1978. Observations on the Greater Kestrel. *Bolmakiers* 30: 35.
- Hunt, W.G., Driscoll, D.E., Bianchi, E.W. & Jackman, R.E. 1992. Ecology of Bald Eagles in Arizona. Part A: Population Overview. Report to US Bur. Reclaim. Biosystems Analysis, Inc., Santa Cruz, California.
- Hunt, W.G., Jackman, R.E., Jenkins, J.M., Thelander, C.G. & Lehmann, R.N. 1992. Northward post-fledging migration of California Bald Eagles. *J. Raptor Res.* 26: 19-23.
- Hunter, D., Douglas, M.G., Stead, D.F., Taylor, V.A., Alder, J.R. & Carter, A.I. 1979. A breeding record and some observations of the Taita Falcon *Falco taitanus* in Malawi. *Ibis* 121: 93-94.
- Husain, K.Z. 1959. Notes on the taxonomy and zoogeography of the genus *Elaenis*. *Condor* 61: 153-154.
- Husler, K. 1976. Notes on the Black Harrier. *Bolmakiers* 28: 75.
- Husler, K. 1983a. Breeding biology of the Peregrine Falcon in Zimbabwe. *Ostrich* 53: 161-171.
- Husler, K. 1983b. Incubation behaviour of the Rufous Hawk. *Ostrich* 53: 156-160.
- Husler, K. 1983c. Breeding biology of the Greater Kestrel. *Ostrich* 53: 129-140.
- Husler, K. 1985. Status of the Bateleur in Zimbabwe. *Honeyguide* 31: 137-144.
- Husler, K. 1988. Why are Peregrines so rare in South Africa. *Ostrich* 58: 86-88.
- Husler, K. & Howells, W.W. 1987. Breeding periodicity, productivity and conservation of the Martial Eagle. *Ostrich* 58: 135-138.
- Husler, K. & Howells, W.W. 1989a. Breeding biology of the Hooded and Lappet-faced Vultures in the Hwange National Park. *Honeyguide* 34: 109-115.
- Husler, K. & Howells, W.W. 1989b. Breeding biology of the White-headed Vulture in the Hwange National Park, Zimbabwe. *Ostrich* 59: 21-24.
- Husler, K. & Howells, W.W. 1989c. The effect of primary production on breeding success and habitat selection in the African Hawk Eagle. *Condor* 90: 585-587.
- Huxley, J. 1955. Morphism in birds. *Int. Orn. Congr.* 11: 309-328.
- Husler, K. & Howells, W.W. 1989. Habitat preference, breeding success and the effect of primary productivity on Tawny Eagles *Aquila rapax* in the tropics. *Ibis* 131: 33-40.
- Hutton, K. 1991. Kleptoparasitism of Australian Ravens by Black Falcons. *Aust. Birds* 28: 29-31.
- Huxley, J. & Nicholson, E.M. 1965. Lammergeier *Cypoptus barbatus* breaking bones. *Ibis* 105: 106-107.
- Iankov, P., Khristov, K. & Avramov, S. 1994. Changes in status of the Black Vulture *Agypius monachus* in Bulgaria for the period 1980-1990. In: Meyburg & Chancellor 1994a.
- Iankov, P., Petrov, T., Miches, T., Proftirov, L. 1994. Past and present status of the Lesser Kestrel *Falco naumanni* in Bulgaria. In: Meyburg & Chancellor 1994a.
- Ivinsky, I.V., Fetisov, S.A. & Fiodorov, V.A. 1990. [Materials on the biology of Marsh Harrier in NW of the RSFSR]. *Vestn. Leningr. Univ. Biol.* 1990-3: 3-10. In Russian with English summary.
- Incausti, J.A. 1986. Biología del Aguila Perdizera *Hieraaetus fasciatus* (Vieillot 1822) en Navarra. PhD thesis, Universidad de Navarra, Spain.
- Inskipp, C. & Inskipp, T. 1991. *A Guide to the Birds of Nepal*. 2nd edition. Christopher Helm, London.
- Inigo-Elias, E.E. 1993. Habitat use and relative abundance of the Bat Falcon in the Selva Lacandona region of Chiapas, Mexico. *J. Raptor Res.* 27(1): 73-74.
- Inigo-Elias, E.E., Ramon, M. & González, F. 1987. Two recent records of neotropical eagles in southern Veracruz, Mexico. *Condor* 89(3): 671-672.
- Iriarte, J.A., Franklin, W.L. & Johnson, W.E. 1990. Diets of sympatric raptors in southern Chile. *J. Raptor Res.* 24(3): 41-46.
- Iribarren, J.J. & Rodríguez Arbeloa, A. 1988. Sobre la biología del Aguila Calzada *Hieraaetus pennatus* (Gmelin, 1788) en Navarra. *Publ. Biol. Univ. Navarra (Ser. Zoológica)* 17: 1-27.
- Irwin, M.P.S. 1981. *The Birds of Zimbabwe*. Quest Publishing, Harare.
- Irwin, M.P.S., Benson, C.W. & Steyn, P. 1982. The identification of the Ouzambo and Red-breasted Sparrow Hawks in south central Africa. *Honeyguide* 111/112: 28-44.
- Ismagilov, M.I. 1982. [On the breeding period in the Steppe Eagle in central Kazakhstan]. Pp. 3-4 in: *Mat. III Vsesoyuzn. ornit. konf. Leningr. Part 2*. In Russian.
- Itänie, J. & Korppuäki, E. 1987. Insect food of the kestrel *Falco tinnunculus* during breeding in western Finland. *Aquila Ser. Zool.* 25: 21-31.
- Ivanov, V.V. 1952. [New information on the ecology of the Steppe Eagle]. *Dopr.* 12: 123. In Russian.
- Ivanovskiy, V.V. 1993a. [Materials on comparative ecology of the Greater Spotted Eagle (*Aquila clanga*) and Lesser Spotted Eagle (*Aquila pomarina*)]. Pp. 15-25 in: ONP NPEC 'Veras-eco' & Inst. of Zool. Ac. Sci. Belarus. In Russian.
- Ivanovskiy, V.V. 1993b. [The Greater Spotted Eagle in the Vitelsk Region]. Pp. 215-215 in: *Problems of the Conservation of Biological Diversity in Belarus*. Abstr. of Intern. Scient. Pract. Conf., Minsk. In Russian.
- Iron, R.J. 1985. Sloths and other mammalian prey of the Harpy Eagle. Pp. 343-346 in: Montgomerie, 1985.
- Jahn, H. 1942. Zur Ökologie und Biologie der Vogel Japans. *J. Orn.* 90: 16-302.
- Jake, M.D. & Gatz, T.A. 1984. Harris Hawks feeding on fish. *Southwestern Naturalist* 29(4): 506.
- Jaksic, F.M. & Delibes, M. 1987. A comparative analysis of food-niche relationships and trophic guild structure in two assemblages of vertebrate predators dif-

- Mendelsohn & Sapsford eds. 1984.
- Jones, C.G. 1987. The larger land birds of Mauritius. Pp. 208-300 in: Diamond 1987.
- Jones, C.G. 1989. Aerial display of the Reunion Harrier. *Gabari* 4: 22-23.
- Jones, C.G. 1991. The conservation management of the Mauritius Kestrel *Falco punctatus*. *Gabari* 6: 42-46.
- Jones, C.G. 1998. Saved. *On the Edge* 81: 1-2.
- Jones, C.G., Heck, W., Lewis, R.E., Mungroo, Y. & Cade, T.J. 1991. A summary of the conservation management of the Mauritius Kestrel *Falco punctatus* 1978-1991. *Dodo* 27: 81-99.
- Jones, C.G. & Swinnerton, K.J. 1997. A summary of the conservation status and research for the Mauritius Kestrel *Falco punctatus*, Pink Pigeon *Columbus nasuta* and Echo Parakeet *Ptilinopus echo*. *Dodo (J. Jersey Wildl. Preserv. Trust)* 33: 72-75.
- Jones, J.M.B. 1985. The breeding cycle of the African Cuckoo Hawk. *Honeyguide* 31: 196-202.
- Jones, S. 1979. Habitat Management Series for Unique or Endangered Species. Report No. 17. The accipiters: Goshawk, Cooper's Hawk, Sharp-shinned Hawk. US Department Interior, Bur. Land Management Tech. Note 335.
- Jones, S. & Bren, W. 1978. Observations on the wintering behaviour of Victorian Peregrine Falcons. *Aust. Bird Watcher* 7: 198-203.
- Jordann, P. 1981. Relaciones interespecificas y coexistencia entre el Aguila Real (*Aquila chrysaetos*) y el Aguila Perdizera (*Hierosias fuscatus*) en Sierra Morena Central. *Ardeola* 28: 67-88.
- Jørgensen, E., Bomholt, P., Bogelund, S. & Jensen, P.E. 1982. The breeding population of the Marsh Harrier (*Circus aeruginosus*) in Denmark 1979-1981. *Dan. Orn. Foren. Tidsskr.* 76(1-2): 3-14.
- Junge, G.C.A. & Mees, G.F. 1958. *The Avifauna of Trinidad and Tobago*. E.J. Brill (Zool. Verhand. 57), Leiden.
- Kalaber, I. 1984. Note sulla biologia e lo sviluppo postembrionale dell'Autore. *Accipiter gentilis*, in Romania. *Riv. Ital. Orn.* 54(3-4): 179-190.
- Kalaber, I. 1974. [Contribution a la connaissance de la biologie de la reproduction et du développement postembryonnaire des petits du l'Aigle pomarin (*Aquila pomarina*)] *Studia si comunicari* 1974: 95-118. In Romanian with French summary.
- Kalla, P. & Abop, F. 1983. The distribution, habitat-preference, and status of the Mississippi Kite in Tennessee. *Amer. Birds* 37: 146-149.
- Kalyakin, V.N. & Vinogradov, V.G. 1981. On the nesting of the Gyrfalcon (*Falco rusticolus intermedius* Gloger, 1834) in the southern part of the Yamal Peninsula. *Bull. MOIP (Biol.)* 86: 42-51.
- Kaup, K. & Wille, F. 1990. [The White-tailed Eagle population in Greenland]. *Dan. Orn. Foren. Tidsskr.* 84(1-2): 37-44. In Danish with English summary.
- Karmali, J. & Karmali, J. 1968. A study of the Secretary Bird. *Bokmakere* 20: 63-65.
- Keast, A. & Morton, E.S. eds. 1990. *Migrant Birds in the Neotropics. Ecology, Behavior, Distribution and Conservation*. Smithsonian Institution Press, Washington, D.C.
- Kelly, G.M. & Thorpe, J.P. 1993. A communal roost of Peregrine Falcons and other raptors. *British Birds* 86: 49-52.
- Kemp, A.C. 1972. The use of man-made structures for nesting sites by Lanner Falcons. *Ostrich* 43: 65-66.
- Kemp, A.C. 1978. Territory maintenance and use by breeding Greater Kestrels. Pp. 71-76 in Kemp. 1986.
- Kemp, A.C. ed. 1978. *Proceedings of a Symposium on African Predatory Birds*. Northern Transvaal Ornithological Society, Pretoria.
- Kemp, A.C. 1984. Preliminary description of the dynamics of a Greater Kestrel population. Pp. 141-150 in: Mendelsohn & Sapsford, eds. 1984.
- Kemp, A.C. 1985. Secretary-bird. Page 527 in: Campbell & Lark 1985.
- Kemp, A.C. 1986. The Gabar Goshawk: taxonomy, ecology and further research. *Gabari* 1: 4-6.
- Kemp, A.C. 1987. Linear and weight measurements of mated pairs of Greater Kestrels. Pp. 151-155 in: Bird, D.M. & Bowman, R. (eds) *The ancestral kestrel*. Ste. Anne de Bellevue, Quebec Raptor Research Foundation and Macdonald Raptor Research Centre of McGill University.
- Kemp, A.C. 1989. Flight and nest display by Gabar Goshawk. *Gabari* 3: 5-5.
- Kemp, A.C. 1991. Timing of laying by Greater Kestrels *Falco rupestris* near Pretoria, South Africa. *Ostrich* 62: 35-39.
- Kemp, A.C. 1993. Breeding biology of Lanner Falcons near Pretoria, South Africa. *Ostrich* 64: 26-31.
- Kemp, A.C. 1994. A comparison of hunting behaviour by each sex of adult Greater Kestrels *Falco rupestris* resident near Pretoria, South Africa. *Ostrich* 65: 21-33.
- Kemp, A.C. 1995. Aspects of the breeding biology and behaviour of the Secretarybird *Sagittarius serpentarius* near Pretoria, South Africa. *Ostrich* 66: 61-68.
- Kemp, A.C. & Crowe, T.M. 1990. A preliminary phylogenetic and biogeographic analysis of the genera of diurnal raptors. Pp. 161-175 in: Peters & Hutterer, eds. 1990.
- Kemp, A.C. & Crowe, T.M. 1993. A morphometric analysis of *Falco* species. Pp. 223-232 in: Nicholls & Clarke 1993.
- Kemp, A.C. & Crowe, T.M. 1994a. A Morphometric Analysis of *Accipiter* species. In: Meyburg & Chancellor 1994a.
- Kemp, A.C. & Crowe, T.M. 1994b. Morphometrics of Falconets and hunting behaviour of the Black-thighed Falconet *Microhierax fringillarius*. *Ibis* 136(1): 14-49.
- Kemp, A.C. & Dean, W.R.J. 1989. Diet of African Marsh Harrier from pellets. *Gabari* 3: 54-55.
- Kemp, A.C. & Filmer, M. 1989. The diet of Greater Kestrels *Falco rupestris* near Pretoria, South Africa. *Ostrich* 60: 63-68.
- Kemp, A.C. & Kemp, M.I. 1974. Don't forget the big birds. *Afr. Wildl.* 28: 12-13.
- Kemp, A.C. & Kemp, M.I. 1975a. Observations on the breeding biology of the Oyambo Sparrowhawk, *Accipiter occipennis* Gurney (Aves: Accipitridae). *Ann. Transvaal Mus.* 29: 185-190.
- Kemp, A.C. & Kemp, M.I. 1975b. Observations on the White-backed vulture *Cypsa africana* in the Kruger National Park, with notes on other avian scavengers. *Kordof* 18: 51-68.
- Kemp, A.C. & Kemp, M.I. 1975c. Random notes on some Sarawak birds. *Amazak Mu. J.* 24: 273-276.
- Kemp, A.C. & Kemp, M.I. 1976. Nesting cycle of the Gabar Goshawk. *Ostrich* 47: 127-129.
- Kemp, A. & Kemp, M. 1998. *Birds of Pity of Africa and its Islands*. London & Cape Town.
- Kemp, A.C. & Mendelsohn, J. 1975. What colour is Wahlberg's Eagle? *Bokmakere* 27: 72-74.
- Kemp, A.C. & Rautenbach, I.I. 1989. Bat Hawks or Bat-eating Hawks? *Gabari* 2: 4-6.
- Kemp, A.C. & Snelling, J.C. 1975. Ecology of the Gabar Goshawk in southern Africa. *Ostrich* 44: 154-162.
- Kemp, M.I. & Kemp, A.C. 1978. *Bucconis* and *Sagittarius*: two modes of terrestrial predation. Pp. 13-16 in: Kemp, A.C. ed. 1978. *Proceedings of a Symposium on African Predatory Birds*. Northern Transvaal Ornithological Society, Pretoria.
- Kennedy, P.L. 1987. Habitat Characteristics of Cooper's Hawks and Northern Goshawks nesting in New Mexico. Pp. 218-227 in: *Southwest Raptor Management Symposium and Workshop*.
- Kennedy, P.L. & Johnson, D.R. 1986. Prey-size selection in nesting male and female Cooper's Hawks. *Wilson Bull.* 98: 110-115.
- Kennedy, R.S. 1977. Notes on the biology and population status of the Monkey-eating Eagle of the Philippines. *Wilson Bull.* 89: 1-20.
- Kennedy, R.S. 1981. The air's noblest fier. *Am. J. Sci. & Cult.* 2: 33-48.
- Kennedy, R.S. 1985. Can Filipinos learn to love this bird? *Int. Wildl.* 13(4): 26-33.
- Kennedy, R.S. 1985. Conservation research of the Philippine Eagle. *Natl. Geogr. Soc. Res. Rep.* 18: 401-414.
- Kenward, R.E. 1978. Hawks and doves: factors affecting success and selection in Goshawk attacks on Woodpigeon. *J. Anim. Ecol.* 47: 449-460.
- Kenward, R.E. 1981. Goshawk re-establishment in Britain: causes and implications. *Falconer* 7(5): 304-310.
- Kenward, R.E. 1982. Goshawk hunting behaviour and range size as a function of food and habitat availability. *J. Anim. Ecol.* 51(1): 69-80.
- Kenward, R.E. & Lindsay, M. 1981. *Understanding the Goshawk*. International Association for Falconry, London, England.
- Kenward, R.E., Maccrann, V. & Karlsson, M. 1981. Goshawk winter ecology in Swedish pheasant habitats. *J. Wildl. Manage.* 45: 397-408.
- Kenward, R.E., Maccrann, V. & Karlsson, M. 1993. Post-nesting behaviour in Goshawks, *Accipiter gentilis* L. The causes of dispersal. II. Sex differences in sociality and nest-switching. *Anim. Behav.* 40: 565-570, 371-378.
- Keran, D. 1978. Nest site selection by the Broad-winged Hawk in north central Minnesota and Wisconsin. *J. Raptor Res.* 12: 15-20.
- Kerlinger, P. 1989. *Flight Strategies of Migrating Hawks*. University of Chicago Press, Chicago.
- Key, A. & Srijj, J. 1957. Distribution, biologie et alimentation du Faucon Kobes *Falco vespertinus* L. en Hongrie. *Alauda* 25: 1-22.
- Khachar, S. & Mundkur, T. 1989. Status and distribution of the King Vulture *Sarcogyps calurus* (Scopoli) in Gujarat: Results of a recent enquiry. *J. Bombay*

- Nat. Hist. Soc. 86: 360-362.
- Kharchenko, V.I. & Minoransky, V.A. 1967. [On contemporary distribution of the Steppe Eagle (*Aquila rapax* Temm.) in the European part of the USSR]. *Zoologicheskii Zhurnal* 46: 958-960. In Russian.
- Kiff, L.F. 1985. An historical perspective on the condor. *Outdoor California* 11: 5-6, 34-37.
- Kiff, L.F. 1990. To the brink and back: the battle to save the California Condor. *Terra* 28: 6-18.
- Kiff, L.F., Peakall, D.B. & Hector, D.P. 1980. Eggshell thinning and organochlorine residues in the Bat and Aplomado Falcons in Mexico. Pp. 949-952 in: *Proc. XVI Int. Orn. Congr.*, Berlin, 1978.
- Kiff, L.F., Wallace, M.P. & Gale, N.B. 1989. Eggs of captive Crested Eagles (*Morphnus guianensis*). *J. Raptor Res.* 23(3): 107-109.
- Kilham, I. 1980. Pre-nesting behavior of the Swallow-tailed Kite (*Elanoides forficatus*), including interference by an unmated male with a breeding pair. *J. Raptor Res.* 14(1): 29-31.
- Kilue, R.A. 1987. Winter abundances of Red-tailed and Red-shouldered Hawks in Florida: an analysis of Christmas Bird Count data, 1946-1983. *Florida Field Nat.* 15: 45-51.
- Kimberly, T. & Mosher, J.A. 1981. Nest-site habitat selected by woodland hawks in Central Appalachians. *Auk* 98: 270-281.
- Kimmel, V.L. & Fredrickson, I.H. 1981. Nesting ecology of the Red-shouldered Hawk in southeastern Missouri. *Trans. Missouri Acad. Sci.* 15: 21-27.
- King, B. 1979. New distributional records and field notes for some New Guinean birds. *Faua* 7(1): 146-148.
- King, B.F. 1990. Little Eagle *Hieranetus morphnoides*. *Kukula* 5(1): 77.
- King, B.F., Buck, H. & Yang, D. 1990. Grey-headed Fish-eagle *Icthyophaga ichthyetus*. *Kukula* 5(1): 75.
- King, B.F., Dickinson, J.C. & Woodcock, M. 1975. *A Field Guide to the Birds of Southeast Asia*. Collins, London.
- King, W.B. ed. 1978-79. *Endangered Birds of the World: the ICBP Bird Red Data Book Vol. 2*. 2nd edition. IUCN, Morges, Switzerland.
- Kipp, S.A. 1959. Der Handflügel-Index als biologisches Maß. *Vogelwarte* 20: 77-96.
- Kipp, S.A. 1959. Der Handflügel-Index als biologisches Maß. *Vogelwarte* 20: 77-86.
- Kirkcunell, A. & Garrido, O. 1991. The Osprey nesting in Cuba. *Volante Migratorio* 16: 28-29.
- Kirkley, J.S. 1991. Do migrant Swainson's Hawks fast en-route to Argentina? *J. Raptor Res.* 25: 82-86.
- Kirkwood, J.K. 1980. Energy and prey requirements of the young free-flying kestrels. *Humk Trust Ann. Rep.* 10: 12-14.
- Kirkwood, J.K. 1981a. Energy and nitrogen exchange during growth in the Kestrel (*Falco tinnunculus*). *Proc. Nutt. Soc.* 40: 6.
- Kirven, M.N. 1976. The Ecology and Behavior of the Bat Falcon, *Falco rufigularis*. PhD dissertation, University of Colorado, Boulder.
- Kishchunskii, A.A. 1958. On the biology of the Gyrfalcon on the Kola Peninsula. *Proc. Mos. State Univ.* 197: 61-74.
- Kislenko, G.S. 1985. [Lesser Spotted Eagle in man-made landscape in Kuban]. Pp. 48-50 in: [Conservation of Birds of Prii]. Nauka, Moscow. In Russian.
- Kitowski, I. 1994. Montagu's Harrier *Circus pygargus* post-fledging activities in Eastern Poland - preliminary results. In: Meyburg & Chancellor 1994a.
- Kjellén, N. 1992. Differential timing of autumn migration between sex and age groups in raptors at Falsterbo, Sweden. *Ornis Scand.* 23: 420-434.
- Kjellén, N. 1994. Differences in age and sex ratio among migrating and wintering raptors in southern Sweden. *Auk* 111: 274-281.
- Kjellén, N. 1995. Ålders- och könsfördelning hos sträckande rovfåglar över Falsterbohalsön hösten 1994. *Anas* 34: 85-104.
- Kjow, C.G. 1992. Bald Eagle numbers continue to rise. *US Fish Wildl. Serv. Endang. Species Tech. Bull.* 171(2): 5-4.
- Klapste, J. 1983. Observations of two species of kites fishing. *Faua* 5: 276-279.
- Klapste, J. 1990. Movement of Brown Falcon *Falco berigora* from Victoria to Tasmania. *Austr. Bird Watcher* 15: 166-167.
- Klapste, J. & Klapste, P. 1982. Successful rearing of young of the Spotted Harrier in an artificial nest. *Condor* 6: 42-45.
- Klau, W. 1985. Spotted Harriers *Circus assimilis* nesting on the Nullarbor Plain. *Austr. Bird Watcher* 11: 46-48.
- Klein, B.C. & Bierregaard, R.O. 1988a. Capture and telemetry techniques for the Lined Forest-falcon (*Microraptor glaucollis*). *J. Raptor Res.* 22(1): 29.
- Klein, B.C. & Bierregaard, R.O. 1988b. Movement and calling behavior of the Lined Forest-falcon (*Microraptor glaucollis*) in the Brazilian Amazon. *Condor* 90(2): 197-199.
- Klein, B.C., Harper, L.H., Bierregaard, R.O. & Powell, G.V.N. 1988. Nesting and feeding behavior of the Ornate Hawk-eagle, *Spryaetus ornatus*. *Condor* 90(1): 239-241.
- Klimanis, J.F. & Mochione, F.N. 1987. *Area de la Reserva Integral de Selva Marginal de Punta Lara y sus Alrededores*. Dirección de Servicios Generales del Ministerio, Argentina.
- Knight, C.W.R. 1927. *The Book of the Golden Eagle*. Hodder and Stoughton, London, UK.
- Knight, R.L. & Erickson, A.W. 1976. High incidence of snakes in the diet of nesting Red-tailed Hawks. *J. Raptor Res.* 10: 108-111.
- Knystantas, A. 1993. *Birds of Russia*. HarperCollins, London.
- Kochert, M.N., Millsap, B.A. & Steenhof, K. 1988. Effects of livestock grazing on raptors with emphasis on the southwest. Pp. 325-334 in Pendleton, ed. 1988.
- Koepcke, M. 1961. Birds of the western slope of the Andes of Peru. *Amer. Mus. Novit.* 2028: 1-31.
- Koepcke, M. 1970. *The Birds of the Department of Lima, Peru*. Livingston Publishing Company, Wynnewood, PA.
- Koepcke, M. 1972. Über die resistenzformen der Vogelnester in einem bergigen Gebiet des tropischen Regenwaldes in Peru. *J. Orn.* Leipzig 113: 158-160.
- Kolford, C.B. 1955. *The Californian Condor*. Natl. Audubon Soc. Res. Rep. 6.
- Koga, K. & Shiraishi, S. 1987. [Parental care of nestling in the Black-eared Kite *Milvus migrans*]. *Jap. J. Orn.* 36(2): 87-97. In Japanese with English summary.
- Koga, K., Shiraishi, S. & Uchida, T.A. 1989a. Breeding ecology of the Black-eared Kite *Milvus migrans lineatus* in the Nagasaki Peninsula, Kyushu. *Jap. J. Orn.* 38: 57-66.
- Koga, K., Shiraishi, S. & Uchida, T.A. 1989b. Growth and development of the Black-eared Kite.
- Komen, J. 1992. Energy requirements of adult Cape Vultures *Caps corprotheres*. *J. Raptor Res.* 26: 213-218.
- Konishi, M. 1993. Hearing with two ears. *Am. American* April 1993: 34-41.
- Konrad, P.M. & Gilmer, D.S. 1986. Post fledging behavior of Ferruginous Hawks in North Dakota. *J. Raptor Res.* 20: 35-39.
- Konrad, H.U. 1966. Zur Brutbiologie der Rohrweisse. *Falke* 15: 364-368.
- Kopens, M.I. 1988a. Effect of Thornbrush on Distribution and Nest Site Selection of White-tailed Hawks (*Buteo albicaudatus*) in south Texas. PhD dissertation, North Dakota St. University.
- Kopens, M.I. 1988b. White-tailed Hawk. Pp. 97-104 in: Gilinski et al. 1988.
- Koplin, J.R. 1973. Differential habitat use by sexes of American Kestrels wintering in northern California. *J. Raptor Res.* 7: 39-42.
- Koplin, J.R., Collops, M.W., Bammann, A.R. & Levenson, H. 1980. Energetics of two wintering raptors. *Auk* 97(4): 795-806.
- Korelov, M.N. 1962. Steppe Eagle. Pp. 644-651 in: Gavrin, V.F., Dolgushin, I.A., Korelov, M.N. & Kusmina, M.A. 1962. [Birds of Kazakhstan]. Vol. 2. Akad. Nauk Kazakh. SSR, Alma Ata. In Russian.
- Korn, T. 1986. Mallerfowl *Lepus ocellatus* attacked by Brown Goshawk *Accipiter javanicus*. *Austr. Bird Watcher* 11: 274-275.
- Korpimäki, E. 1985. Diet of the Kestrel *Falco tinnunculus* in the breeding season. *Ornis Fenn.* 62: 130-137.
- Korpimäki, E. 1986. Reversed sexual size dimorphism in birds of prey, especially in Tengmalm's Owl *Aegolius funereus*: a test of the 'starvation hypothesis'. *Ornis Scand.* 17: 326-332.
- Korpimäki, E. 1986. Diet variation, hunting habitat and reproductive output of the Kestrel *Falco tinnunculus* in the light of optimal diet theory. *Ornis Fenn.* 63: 84-90.
- Korshunov, F. & Korshunova, E. 1985. Breeding of the Black Vulture in the Nurata Mountains. Pp. 36-51 in: *Bull. World Working Group on Birds of Prey* 2: 30-51.
- Koster, F. 1982. Observations on migratory Turkey Vultures and Lesser Yellow-headed Vultures in northern Colombia. *Auk* 99: 572-575.
- Koster, F. & Koster-Stoewesand, H. 1978. Königseier Beobachtungen im Tayrona-Nationalpark im Norden Kolumbiens, Südamerika. *Zeitschrift des Kölner Zoo* 2: 35-41.
- Kotvin, A.B. 1985. [On distribution and numbers of the Steppe Eagle in central Kalmykia]. Pp. 112-117 in: [Fauna and ecology of terrestrial vertebrates on territories with different levels of anthropogenic pressure]. V.I. Lenin MGPI, Moscow. In Russian.
- Kostrzewa, A. 1985. Zur Biologie des Wespenbussard (*Pernis ptilorhynchus*) in Teilen der 'Niederrheinischen Bucht' mit besonderen Anmerkungen zur Methodik bei Greifvogeluntersuchungen. *Ökol. Jäger* 7: 113-134.
- Kostrzewa, A. 1986. Quantitative

- Untersuchungen zur Ökologie, Habitatnutzung und Habitattrennung von Mäusebussard (*Buteo buteo*), Habicht (*Accipiter gentilis*) und Wespenbussard (*Pernis apivorus*) unter Berücksichtigung von Naturschutzmanagement und Landschaftsplanung. PhD thesis, University of Cologne.
- Kostrzewa, A. 1987. Quantitative Untersuchungen zur Habitattrennung von Mäusebussard (*Buteo buteo*), Habicht (*Accipiter gentilis*) und Wespenbussard (*Pernis apivorus*). *J. Orn.* 128: 209-229.
- Kostrzewa, A. 1989. The effect of weather on density and reproduction success in Honey Buzzard *Pernis apivorus*. Pp. 187-192 in: Meyburg & Chancellor 1989.
- Kostrzewa, A. 1991. Interspecific interference competition in three European raptor species. *Ecology, Ecology & Evolution* 3: 127-143.
- Kostrzewa, A. 1996. *Pernis apivorus* Honey Buzzard. *BBP Update* 2: 107-120.
- Kostrzewa, R. & Kostrzewa, A. 1997. Breeding success of the kestrel *Falco tinnunculus* in Germany. Results 1983-1994. *J. Orn.* 138: 73-82.
- Kostrzewa, A. & Kostrzewa, R. 1990. The relationship of spring and summer weather with density and breeding performance of the Buzzard *Buteo buteo*, Goshawk *Accipiter gentilis* and Kestrel *Falco tinnunculus*. *Ibis* 132: 550-559.
- Kostrzewa, A. & Kostrzewa, R. 1991. Population limitation in Buzzards *Buteo buteo* and Kestrels *Falco tinnunculus*: the different roles of habitat, food and weather. In: Meyburg & Chancellor 1991a.
- Kostrzewa, R. 1988. [Density of Kestrels in Europe: a review and some critical comments]. *Die Vogelwarte* 34: 216-224.
- Kostrzewa, R. & Kostrzewa, A. 1991. Winter weather, spring and summer density, and subsequent breeding success of Eurasian Kestrels, Common Buzzards and Northern Goshawks. *Aud* 106: 342-347.
- Kouzmanov, G. 1994. L'Aigle pomarin *Aquila pomarina* en Bulgarie. In: Meyburg & Chancellor 1994b.
- Kramer, K. 1955. *Habicht und Sperber*. Neue Brehm-Bücherei. A. Ziemsen Verlag, Wittenberg Lutherstadt.
- Kratter, A.W., Sillett, T.S., Chesser, R.T., O'Neill, J.P., Parker, I.A. III & Castillo, A. 1993. Avifauna of a Chaco locality in Bolivia. *Wilson Bull.* 105(1): 114-141.
- Krugwald, K.L., Dijkstra, C., Visser, G.H. & Daan, S. 1998. Energy requirements for growth in relation to sexual size dimorphism in marsh harrier *Circus aeruginosus* nestlings. *Physiological Zoology* 71(6): 693-702.
- Krugulev, J. & Létoux, A.B.A. 1994. Breeding Ecology of Montagu's Harrier *Circus pygargus* on natural and reclaimed Marshes in Poland and France. In: Meyburg & Chancellor 1994a.
- Król, W. 1985. The status of eagles in Poland. *Hull. World Working Group on Birds of Prey* 1: 61-67.
- Krueger, R. 1970. First finding of the egg of *Circus fasciatus*. *Ibis* 112: 117-118.
- Krupa, R.F. 1989. Social and biological implications for endangered species management: the Philippine Eagle *Pithecophaga jefferyi*. Pp. 301-314 in: Meyburg & Chancellor 1989.
- Krüper, J. 1864. Beitrag zur Naturgeschichte des Eleonorenfalke, *Falco eleonore*. *J. Orn.* 12: 1-23.
- Kruuk, H. 1967. Competition for food between vultures in East Africa. *Ardea* 55: 171-193.
- Kuhlman, F. 1981. Black-eared Kite populations in Kobe City, Japan. *Tori* 30: 75-85.
- Kuhlman, F. 1987. The demise of the Black-eared Kite (*Mibius nigrum*) in Kobe, Japan. *Jap. J. Orn.* 36: 79-86.
- Kuernerloewe, H. & Geroulet, P. 1964. Le Gypaète barbu *Gypaetus barbatus aureus* (Habicht) à l'Ulu Dag (Olympe de Bithynie) et en Asie Mineure. *Aloude* 32: 51-55.
- Kuroda, N. 1955-1956. *Birds of the Island of Java*. Tokyo.
- Kushlan, J. & Baw, O.L. 1983a. Decreases in the south Florida Osprey population, a possible result of food stress. Pp. 187-200 in: Bird 1983.
- Kushlan, J. & Baw, O.L. 1983b. The Snail Kite in the southern Everglades. *Florida Field Nat.* 11: 108-110.
- Kunt, E. 1962. A record of a tree-nesting Gyrfalcon. *Condor* 64: 508-510.
- Kurnetsov, A.V. 1994. [Birds of prey of the Kostroma lowland]. Pp. 86-93 in: E.N. Kurochkin, ed. [Modern Ornithology]. Nauka, Moscow. [In Russian].
- Lack, D. 1968. Ecological adaptations for breeding in birds. Methuen, London.
- Ladd, W.N. & Schempf, P.F. eds. 1982. *Proceedings of a Symposium, Raptor Management and Biology in Alaska and Western Canada*. FWS, AK PRCA-82.
- Ladigin, A.V., Lubkov, I.G. & Ladigina, O.N. 1991. [Huge concentration of wintering Steller's Sea Eagle at Kuril Lake (South Kamchatka)]. *Bull. Moscow Soc. Natur. Learn.* 96: 48-50. In Russian.
- Laing, K. 1985. Food habits and breeding biology of Merlins in Denali National Park, Alaska. *J. Raptor Res.* 19: 42-51.
- Lamba, B.S. 1970. Nidification of some common Indian birds. No. 8. The Shikra *Accipiter badius*. *Rev. Zool. Surv. India* 62: 11-20.
- Lambert, F.R. 1993. Some key sites and significant records of birds in the Philippines and Sabah. *Bird Conserv. Int.* 3: 281-297.
- Laum, D.W. 1974. White Hawk preying on the Great Tinamou. *Aud* 91: 845-846.
- Land, H.C. 1970. *Birds of Guatemala*. Livingston Publishing Company, Wynnewood, PA.
- Langrand, O. 1987. Distribution, status and conservation of the Madagascar Fish-eagle *Haliaeetus vociferoides* Desmurs 1845. *Biol. Conserv.* 42: 73-77.
- Langrand, O. 1990. *Guide to the Birds of Madagascar*. Yale University Press, New Haven & London.
- Langrand, O. & Mesburg, B.-U. 1984. Birds of prey and owls in Madagascar: their distribution, status and conservation. Pp. 3-14 in: Mendelsohn & Sapsford eds. 1984.
- Langrand, O. & Mesburg, B.-U. 1989. Range, status and biology of the Madagascar Sea Eagle *Haliaeetus vociferoides*. Pp. 269-278 in: Meyburg & Chancellor 1989.
- Langvatn, R. 1977. Characteristics and relative occurrence of remnants of prey found at nesting places of Gyrfalcons *Falco rusticolus*. *Ornis Scand.* 8: 113-127.
- Langvatn, R. & Moksnes, A. 1979. On the breeding ecology of the Gyrfalcon *Falco rusticolus* in central Norway 1968-1974. *Fauna Norvegica (Ser. C, Cinclus)* 2: 27-39.
- Lankin, P.M. 1976. [On the distribution of the Steppe Eagle at the lower Syr Daria]. *Ornithologica* 12: 235-236. In Russian.
- Lanning, D.V. & Hitchcock, M.A. 1991. Breeding distribution and habitat of Prairie Falcons in northern Mexico. *Condor* 93: 762-765.
- Larson, D. 1980. Increase in the White-tailed Kite populations of California and Texas 1944-1978. *Amer. Birds* 34: 690-691.
- La Touche, J.D.D. 1900. Notes on the birds of north-west Fokien. *Ibis* Ser. 7 no. 6: 34-60.
- Laughlin, R.M. 1952. A nesting of the Double-toothed Kite in Panama. *Condor* 54: 137-139.
- Lavauden, L. 1924. Note sur le Pygargue de Corée (*Haliaeetus niger* Heude). *Ann. Mus. Hist. Nat. Marseille* 19: 99-103.
- Lavauden, L. 1932. Etude d'une petite collection d'oiseaux de Madagascar. *Bull. Mus. Nat. Hist. Nat.* 2(4): 629-640.
- Lavauden, L. 1937. Supplément. In: Milne-Edwards, A. & Grandisier, A. 1937. *Histoire Physique, Naturelle et Politique de Madagascar*. 12. Oiseaux. Société d'Éditions Géographiques, Maritimes et Coloniales.
- Lavers, H.J. & Johnson, P.M. 1995. The Black Kite *Milvus migrans* in the Townsville district of Queensland: a comparison of irruption and non-irruption years. In: Olsen 1995a.
- Lavigne, A.J., Bird, D.M., Negro, J.J. & Lacombe, D. Growth of hand-reared American kestrels. I. The effect of two different diets and feeding frequency. *Growth, Development and Aging* 58(4): 191-201.
- Lawrence, S.B. & Gay, C.G. 1991. Behaviour of fledgling New Zealand Falcons (*Falco novaezealandiae*). *Notornis* 38: 175-182.
- Lebraud, C. 1984. Observations sur le comportement et le régime alimentaire de l'Aigle de Bonelli (*Hieraetus fasciatus*) pendant la période de nidification. *Bull. Centre Orn. Cand.* 1: 6-14.
- Léroux, M. 1977. Étude de la reproduction de *Gyps fulvus* dans les Pyrénées occidentales. Université de Bordeaux, France.
- Léconte, M. 1985. Present status of the Griffon Vulture on the Northern slopes of Western Pyrenees. Pp. 117-127 in: Newton & Chancellor 1985.
- Ledger, J.A. ed. 1984. *Proceedings of the 1<sup>st</sup> Pan-African Ornithological Congress*. Southern African Ornithological Society, Johannesburg.
- Ledger, J.A. & Annegarn H.J. 1980. Electrocution hazards to the Cape Vulture *Gyps coprotheres* in South Africa. *Biol. Conserv.* 20: 17-24.
- Lees, S.G. 1968. Notes on the nesting of Wahlberg's Eagle *Aquila wahlbergi*. *Ostrich* 39: 192-193.
- Lees, A. 1991. *A protected forests system for the Solomon Islands*. Maruia Society, Nelson, New Zealand.
- Lehmann, F.C. 1943. El género *Morphnus*. *Caldasia* 2: 165-179.
- Lehmann, F.C. 1959. Contribuciones al estudio de la fauna de Colombia XIV. Nuevas observaciones sobre *Oriocetus isidori* (Des. Mur.). *Noticias Colombianas* 1: 169-195.
- Lehmann, F.C. & Hatter, J. 1960. Notas sobre *Buteo albicollis* Philippi. *Noticias Colombianas* 1: 242-255.
- Lehtonen, I. 1942. Schelladler (*Aquila*

- (*clanga* Pallas) als Bruinvogel in Kananaien, Ost-Karelien. *Ornis Fenn.* 19: 121-122.
- Leighton, F.A., Gerrard, J.M., Gerrard, P., Whitfield, D.W.A. & Maher, W.J. 1979. An aerial census of Bald Eagles in Saskatchewan. *J. Wildl. Manage.* 43: 61-68.
- Lekagul, B. & Round, P.D. 1991. *A Guide to the Birds of Thailand*. Saha Barn Bhaet, Bangkok.
- Lemke, T.O. 1979. Fruit-eating behavior of Swallow-tailed Kites (*Elanoides forficatus*) in Colombia. *Condor* 81(2): 207-208.
- Lemon, W.C. 1991. Foraging behavior of a guild of Neotropical vultures. *Wilson Bull.* 103(4): 698-702.
- Lendrum, A.L. 1975a. Observations on Ayres' Hawk Eagle. *Honeyguide* 81: 41-43.
- Lendrum, A.L. 1975b. Further notes on Ayres' Hawk Eagle in Bulawayo. *Honeyguide* 83: 40-41.
- Lendrum, A.L. 1979. The Augur Buzzard *Buteo rufifurcus augur* in the Matopos, Rhodesia. *Ostrich* 50: 203-214.
- Lendrum, A.L. 1982. Ayres' Hawk Eagle in Bulawayo, Zimbabwe. *Honeyguide* 110: 15-22.
- Lendrum, A.L. & Lendrum, J.P. 1982. Behaviour studies of Augur Buzzards in the Matopos, Zimbabwe. *Ostrich* 53: 242-245.
- Lennerstedt, I. 1985. Foot papillae and pads. In Campbell & Lack (1985).
- Lendrum, A.L. & Lendrum, J.P. 1984.
- León-Vizcaino, L. & Castroviejo, J. 1978. Sobre infecciones estafilocócicas en Aguila Imperial (*Aquila adalberti* Brehm). *Doñana Acta Vertebrata* 7: 89-95.
- Leonard, J. 1995. White-bellied Sea-eagle takes shearwater from sea. *Canberra Bird Notes* 20: 10.
- Leonardi, G. 1994. The home range of the Lanner *Falco biarmicus* Feldberg influences of territory composition. In: Meshburg & Chancellor 1994a.
- Leonardi, G., Longo, A. & Corpina, G. 1992. *Ecology and Behaviour of the Lanner Falcon*. G. Leonardi Editore, Catania.
- Leopold, A.S. & Wolfe, F.O. 1970. Food habits of nesting Wedge-tailed Eagles, *Aquila audax*, in south-eastern Australia. *CSIRO Wildl. Res.* 15: 1-17.
- LeSawyer, A.L. & Williams, F.C. 1959. Notes on a late nesting of Harris' Hawks near Midland, Texas. *Wilson Bull.* 71: 386-387.
- Leshem, Y. 1984. The rapid population decline of Israel's Lappet-faced Vulture *Torgus tracheliotus negevensis*. *Int. Zoo Yearbook* 23: 41-46.
- Lesnich, V.V., Pauchenko, S.Y. & Aetov, V.V. 1986. [Breeding of the Levant Sparrowhawk in the Voroshilovka region]. *Vestnik Zoologii* 1: 50-53. In Russian.
- Lew, N. 1989. Information-sharing and/or information-concealment by the Egyptian Vulture. *Israel J. Zool.* 36: 147-176.
- Lew, N. 1991. Feeding habits and food composition of the Egyptian Vulture *Neophron percnopterus* in Israel. *Israel J. Zool.* 37(5): 169-170.
- Lew, N. & Mendelsohn, H. 1989. Egyptian Vultures: feeding behavior. *Israel Land & Nature* 14: 126-131.
- Lewis, A. & Pomeroy, D. 1989. *A Bird Atlas of Kenya*. A. Balkema, Rotterdam.
- Lewis, M.J. 1987. Australian Kestrels *Falco tinnunculus* feeding on bats. *Aust. Bird Watcher* 12: 126-127.
- Lewis, R.E. 1986. A rain-forest raptor in danger. *Oryx* 20: 170-175.
- Lewis, S.E. & Timm, R.M. 1991. Predation on nesting Bare-throated Tiger-herons by a Great Black Hawk. *Ornithol. Monographs* 2(1): 37.
- Lewin, R. 1985. Why are male hawks so small? *Science (Washington D.C.)* 228 No. 4705: 1299-1300.
- Lewin, R. 1988. Why is the world full of large females? *Science (Washington D.C.)* 240 No. 4854: 884.
- Lev, A.J. 1990. Two breeding records of the Pacific Baza in inland New South Wales. *Aust. Bird Watcher* 13: 258-259.
- Lev, A.J. 1991. A sighting of the Grey Falcon in northern New South Wales. *Aust. Bird Watcher* 14: 29.
- Ligon, J.D. 1967. Relationships of the cathartid vultures. *Oryx Pop. Mus. Zool. Univ. Mich.* 651.
- Ligon, J.S. 1961. *New Mexico Birds and Where to Find Them*. University of New Mexico Press, Albuquerque.
- Lin S.-s. & Lin M.-h. 1986. A Survey of Grey-faced Buzzard-Eagle Hunting in Manchou Area. *Conservation Research Report* 10, KenTing National Park.
- Lincer, J.L., Clark, W.S. & LeFranc, M.N. 1979. *Working Bibliography of the Bald Eagle*. National Wildlife Federation of Science Technical Series 2, Washington, D.C.
- Lindberg, P. 1975. *Pilgrimsfalken i Sverige*. Svenska Naturskyddsforeningen, Stockholm.
- Lindberg, P. 1981. Övanliga bresdjur funna i hus av jaktfalk *Falco rusticolus* och pilgrimsfalk *Falco peregrinus*. *Vår Fågelvärld* 40.
- Lindeman, G.V. 1977. [The Steppe Eagle in the area between the Volga and Kama Rivers]. Pp. 226-228 in: *Mat. VII Vsesoyuzn. ornit. konf. Kaz. Part 2*. In Russian.
- Lindeman, G.V. 1985. [Construction and distribution of nests of the Steppe Eagle in the area between the Volga and Ural Rivers]. Pp. 136-158 in: *Conservation of Birds of Prey*. Moscow. In Russian.
- Lindgren, E. 1972. Courtship display of the White-breasted Sea-Eagle. *Aust. Bird Watcher* 4: 132-133.
- Lippens, L. & Wille, H. 1976. *Les Oiseaux du Zaïre*. Editions Lannois Tiel, Belgium.
- Littlefield, C.D., Thompson, S.P. & Ehlers, B.D. 1984. History and present status of Swainson's Hawks in southeast Oregon. *J. Raptor Res.* 18: 1-6.
- Littlefield, C.D., Thompson, S.P. & Johnstone, R.S. 1992. Rough-legged Hawk habitat selection in relation to livestock on Malheur National Wildlife Refuge, Oregon. *Northwestern Naturalist* 73(3): 80-84.
- Liu Huan-jin, Feng Jing-yi et al. 1986. Preliminary observations on the ecology of the Upland Buzzard *Buteo hemilaevis* in winter and in spring. *J. Biol.* (1): 20-24.
- Liversidge, R. 1962. The breeding biology of the Little Sparrowhawk *Accipiter minullus*. *Ibis* 105: 399-406.
- Liversidge, R. 1984. The importance of national parks for raptor survival. Pp. 389-600 in: Ledger 1984.
- Liversidge, R. 1989. Factors influencing migration of 'wintering' raptors in southern Africa. In *Raptors in the Modern World*, eds B.-U. Meyburg & R.D. Chancellor. WWGBP, Berlin, London & Paris.
- Lobachev, V.S. 1960. [Materials on the biology of the Imperial Eagle in the NE Aral area]. *Ornithologiya* 3: 306-314. In Russian.
- Lobachev, V.S. 1961. [Spatial dislocation of the Imperial Eagle within its breeding range]. [Abstr. All-Union Scient. Conf. of Young Scientists-Biologists. Moscow State University]. 5: 40-42. In Russian.
- Lobachev, V.S. 1967. [The food of the Imperial Eagle in the NE Aral area]. *Ornithologiya* 8: 366-368. In Russian.
- Lobkov, E.G. 1978. [*Haliaeetus pelagicus* on Kamchatka peninsula]. *Zool. Zhurn. Moscow* 57: 1048-1059. In Russian.
- Lobkov, E.G. 1991. Die Population des Riesenseeadlers *Haliaeetus pelagicus* Pallas auf Kamtschatka und Probleme ihres Schutzes. *Populationsök. Greifvögel u. Falsarten* 2: 141-151.
- Lobkov, E.G. & Neufeldt, I.A. 1986. [Distribution and biology of Steller's Sea Eagle *Haliaeetus pelagicus pelagicus* (Pallas)]. *Proc. Zool. Inst. Acad. Sci. USSR, Leningrad* 150: 107-146. In Russian.
- Lobkov, E.G. & Zueva, I.M. 1985. Insecurity Burden in the population of Steller's Sea Eagle in Kamchatka. Environmental factors reducing breeding success. Pp. 30-33 in: *Ecology of Birds of Prey*. Proceedings of the 1st Conference on Ecology and Protection of Birds of Prey. Nauka, Moscow. In Russian.
- Lobkov, E.G., Pisevetsky, A.A. & Alekseev, S.A. 1988. [Distribution and number of the Steller's Sea Eagle on Kamchatka in winter 1985 and 1986. The First International census]. Pp. 91-103 in: Juvimenko 1988. In Russian.
- Lokemoen, J.T. & Diebbert, H.F. 1976. Ferruginous Hawk nesting ecology and raptor populations in northern South Dakota. *Condor* 78: 464-470.
- Long Guo-zhen. 1982. [Studies on the breeding behaviour of the Pied Harrier *Circus melanoleucos*]. *Chinese J. Zool.* (6): 31-33. In Chinese.
- Longland, W.S. 1989. Reversed sexual size dimorphism: its effect on prey selection by the Great Horned Owl *Bubo virginianus*. *Oikos* 54: 395-398.
- Loof, V. 1981. Habicht - *Accipiter gentilis*. In: Loof, V. & Busche, G. 1981. *Vogelwelt Schleswig-Holsteins*. Vol. 2: Greifvögel. Wachholtz, Neumünster.
- Lorenzini, E. 1963. Grey Kestrel in Tanganyika. *J. East Afr. Nat. Hist. Soc.* 24: 67-70.
- Louette, M. 1975. Fruit-bat as prey of the African Hawk Eagle. *Bull. Brit. Orn. Club* 95: 172-173.
- Louette, M. 1981. *The Birds of Cameroon: An Annotated Check-list*. Palais des Académien, Brussels.
- Louette, M. 1988. *Les Oiseaux des Conques*. Musée Royal de l'Afrique Centrale, Tervuren, Belgique.
- Louette, M. 1991. The Red-tailed Buzzards of Zaïre. *Bull. Brit. Orn. Club* 111: 51-55.
- Louette, M. 1992. The identification of forest Accipiters in central Africa. *Bull. Brit. Orn. Club* 112(1): 50-53.
- Low, D., Grybowski, J.A. & Knopf, F.L. 1985. Influence of various land uses on windbreak selection by nesting Mississippi Kites. *Wilson Bull.* 97: 561-565.
- Love, J.A. 1983. *The Return of the Sea Eagle*. Cambridge University Press, Cambridge.
- Love, J.A. 1988. *The Reintroduction of the White-tailed Sea Eagle to Scotland: 1975-1987*. Research & Survey in Nature Conservation Series 12. Nature Conservancy Council, Peterborough.
- Love, J.A. & Ball, M.E. 1979. White-tailed

- cially at the nest. *Ibis* 87: 224-249.
- Moreau, R.E. 1969. The Sooty Falcon *Falco concolor* Temminck. *Bull. Brit. Orn. Club* 89: 62-67.
- Moreau, R.E. 1972. *The Palearctic-African Bird Migration Systems*. Academic Press, New York.
- Morel, G.J. & Motel, M.Y. 1990. *Les Oiseaux de Sénégal*. Editions de l'Orstom, Paris.
- Morel, G.J. & Poulet, A.R. 1976. Un important dortoir d'*Elanus caeruleus*, Accipitridae, au Sénégal. *Oiseau et RFO* 46: 429-430.
- Morgan, A.D. 1979. Observations on immature fish-eagles. *East Afr. Nat. Hist. Soc. Bull.* 19: 65-66.
- Morgan, A.H. 1948. White-tailed kites roosting together. *Condor* 50: 92-95.
- Mori, S. 1980. Breeding biology of the White-tailed Eagle *Haliaeetus albicilla* in Hokkaido, Japan. *Tori* 29: 47-68.
- Morioka, T., Yamagata, N., Kanouchi, T. & Kawata, T. 1993. *The Birds of Prey of Japan*. Tokyo.
- Morisch, M.Q. 1985. Photographic Guide for Ageing Nestling Ferruginous Hawks. US Bureau of Land Management, Boise, Idaho.
- Moritz, D. & Vauk, G. 1976. Der Zug des Sperbers (*Accipiter nisus*) auf Helgoland. *J. Orn.* 117: 317-328.
- Morneau, F., Brodeur, S., Derarie, R., Carrier, S. & Bird, D.M. 1994. Abundance and distribution of nesting Golden Eagles in Hudson Bay, Quebec. *J. Raptor Research* 28: 220-223.
- Morony, J.L., Buck, W.J. & Farrand, J. 1975. *Reference Lists of the Birds of the World*. Dept. of Ornithology, Amer. Mus. Nat. Hist.
- Morris, P. & Hawkins, F. 1998. *Birds of Madagascar: a Photographic Guide*. Pica Press, Mountfield, UK.
- Morris, F.I. 1976a. Plumage changes and moult pattern of the Brown Loshawk. *Emu* 76: 44-45.
- Morris, F.I. 1976b. Growth of plumage from chick to juvenile in the Wedge-tailed Eagle. *Emu* 76: 86.
- Morris, M.M.J. & Lemon, R.E. 1983. Characteristics of vegetation and topography near Red-shouldered Hawk nests in southwestern Quebec. *J. Wildl. Manage.* 47: 138-149.
- Morrison, J.L. 1993. The elusive caracara: preliminary information from south central Florida. *J. Raptor Res.* 27(1): 77-78.
- Morrison, M.L. 1978. Breeding characteristics, eggshell thinning, and population trends of White-tailed Hawks in Texas. *Bull. Texas Orn. Soc.* 11: 35-40.
- Morvan, R. & Dubchies, F. 1987. Compartements de l'Aigle de Bonelli (*Hieronetus fasciatus*) sur son site de nidification. *Oiseau et RFO* 572: 85-101.
- Mosher, J.A. 1989. Accipiters. Pp. 17-52 in: Pendleton, B.G., ed. 1989. *Proceedings of the Northeast Raptor Management Symposium and Workshop*. National Wildlife Federation Science Technical Series 13. Washington, D.C.
- Mosher, J.A. & Matray, P.F. 1974. Size dimorphism: a factor in energy savings for the Broad-winged Hawk. *Auk* 91: 325-341.
- Muss, D. 1979. Growth of nestlings Sparrowhawks (*Accipiter nisus*). *J. Zool., London* 187: 297-314.
- Mossop, D.H. & Hayes, R.D. 1982. The Yukon Territory Gyrfalcon harvest experiment 1974-80. Pp. 263-280 in Ladd & Schempf, eds. 1982.
- Mossop, D.H. & Hayes, R.D. 1994. Long term trends in the breeding density and productivity of Gyrfalcon *Falco rusticolus* in the Yukon Territory, Canada. In: Meyburg & Chancellor 1994a.
- Mrlík, V. & Pavelka, J. 1994. A contribution to the knowledge of the territorial behaviour of the Imperial Eagle *Aquila heliaca*. In: Meyburg & Chancellor 1994b.
- Msvya, C.A. 1993. Feeding habits of Crowned Eagles *Stephanoaetus coronatus* in Kiwengoma Forest Reserve, Matumbi Hills, Tanzania. Pp. 118-120 in: Wilson 1993.
- Mueller, H.C. 1972. Zone-tailed Hawk and Turkey Vulture: mimicry or aerodynamics? *Condor* 742: 221-222.
- Mueller, H.C. 1986. The evolution of reversed sexual dimorphism in owls: an empirical analysis of possible selective factors. *Wilson Bull.* 98: 387-406.
- Mueller, H.C. 1989. Evolution of reversed sexual size dimorphism: sex or starvation? *Ornis Scandinavica* 20(4): 265-272.
- Mueller, H.C. 1990. The evolution of reversed sexual dimorphism in size in monogamous species of birds. *Biol. Rev.* 65: 553-585.
- Mueller, H.C. & Berger, D.D. 1967a. Fall migration of Sharp-shinned Hawks. *Wilson Bull.* 79: 397-415.
- Mueller, H.C. & Berger, D.D. 1967b. Some observations and comments on the periodic invasions of Goshawks. *Auk* 84: 183-191.
- Mueller, H.C. & Berger, D.D. 1968. Sex ratios and measurements of migrant Goshawks. *Auk* 85: 451-456.
- Mueller, H.C., Meyer, K. 1985. The evolution of reversed sexual dimorphism in size: A comparative analysis of the Falconiformes of the western Palearctic. *Current Ornithology* 2: 65-101.
- Mueller, H.C., Berger, D.D. & Allen, G. 1976. Age and sex variation in the size of Goshawks. *Bird Banding* 47: 310-318.
- Mueller, H.C., Berger, D.D. & Allen, G. 1977. The periodic invasions of Goshawks. *Auk* 94: 652-663.
- Mueller, H.C., Berger, D.D. & Allen, G. 1979a. Age and sex differences in size of Sharp-shinned Hawks. *Bird Banding* 50: 34-44.
- Mueller, H.C., Berger, D.D. & Allen, G. 1979b. The identification of North American accipiters. *Amer. Birds* 33: 236-240.
- Mueller, H.C., Mueller, N.S. & Parker, P.G. 1981. Observations of a brood of Sharp-shinned Hawks in Ontario, with comments on the functions of sexual dimorphism. *Wilson Bull.* 93: 83-92.
- Muir, D. & Bird, D.M. 1984. Food of Gyrfalcons at a nest on Ellesmere Island. *Wilson Bull.* 96: 464-467.
- Müller, J.P. 1988. *Der Bartgeier*. Desertina Verlag, Disentis (Switzerland).
- Mulhe, W.C., Brouwer, J. & Albert, C. 1992. Gregarious behaviour of African Swallow-tailed Kite *Chelictinia vocourensis* in response to high grasshopper densities near Ouhallam, western Niger. *Malimbus* 14: 19-21.
- Mundt, J. & Uhlig, R. 1994. Bemerkenswerte Brutzeit-Ansammlungen von Schreitadlern *Aquila pomarina* im Welsebruch (Uckermark, Brandenburg). In: Meyburg & Chancellor 1994b.
- Mundy, P.J. 1978. The Egyptian Vulture (*Neophron percnopterus*) in Southern Africa. *Biol. Conserv.* 14: 307-315.
- Mundy, P.J. 1982. *The Comparative Biology of Southern African Vultures*. Vulture Study Group, Johannesburg.
- Mundy, P.J. 1983. The conservation of the Cape Griffon Vulture in southern Africa. Pp. 57-74 in: Wilbur & Jackson 1983.
- Mundy, P.J. 1985a. Sexual dimorphism of the African White-headed Vulture *Trigoniceps occipitalis*. *Ibis* 127: 116-119.
- Mundy, P.J. 1985b. The biology of vultures: a summary of the working proceedings. Pp. 457-482 in: Newton & Chancellor 1985.
- Mundy, P.J. 1987. Notes on the White-headed Vulture. *Vulture News* 17: 11-15.
- Mundy, P.J. 1988. Some recent bird strikes on aeroplanes in Zimbabwe. *Honeyguide* 35: 60.
- Mundy, P.J. & Cook, A.W. 1972. Vultures. *Bull. Nigerian Orn. Soc.* 9: 8-9.
- Mundy, P.J. & Cook, A.W. 1975. Hatching and rearing of two chicks by the Hooded Vulture. *Ostrich* 46: 45-50.
- Mundy, P.J. & Ledger, J.A. 1976. Griffon Vultures, carnivores and bones. *S. Afr. J. Sci.* 72: 106-110.
- Mundy, P.J., Burchett, D., Ledger, J. & Pipet, S. 1992. *The Vultures of Africa*. Academic Press, London.
- Mundy, P.J., Grant, K.L., Tannock, J. & Wewels, C.L. 1982. Pesticide residues and egg shell thickness of Griffon Vulture *Gyps coprotheres* in Southern Africa. *J. Wildl. Manage.* 46: 769-773.
- Mundy, P.J., Ledger, J.A. & Friedman, R. 1980. The Cape Vulture project in 1977 and 1978. *Bokmakierie* 32: 2-8.
- Munro, G.C. 1960. *Birds of Hawaii*. Charles E. Tuttle Co., Rutland, Vermont.
- Murphy, J.R. 1974. Status of a Golden Eagle population in central Utah, 1967-1973. *Rap. Res. Rep.* 3: 91-96.
- Murphy, J.R. 1978. Management considerations for some western hawks. *Trans. North Amer. Wildl. Nat. Resour. Conf.* 43: 241-251.
- Murphy, R.C. 1955. Feeding habits of the Everglade Kite (*Hastehanus sociabilis*). *Auk* 72: 204-205.
- Murphy, R.K., Gratson, M.W. & Rosenfield, R.N. 1988. Activity and habitat use by a breeding male Cooper's Hawk in a suburban area. *J. Raptor Res.* 22: 97-100.
- Murray, B.G. 1964. A review of Sharp-shinned Hawk migration along the northeastern coast of the United States. *Wilson Bull.* 257-264.
- Murton, R.K. 1971. Polymorphism in Ardeidae. *Ibis* 113: 97-99.
- Mvers, J.H. 1978. Sex-ratio adjustment under food stress: maximisation of quality or numbers of offspring. *Amer. Nat.* 112: 381-388.
- Nakagawa, H. & Fujimaki, Y. 1988. [Winter census of *Haliaeetus pelagicus* (Pall.) in Japan in 1986; the first international census]. Pp. 104-107 in: Litvinenko 1988. In Russian.
- Nakagawa, H., Lobkov, F.G. & Fujimaki, Y. 1987. Winter censuses on *Haliaeetus pelagicus* in Kamchatka and northern Japan in 1985. *Strix* 6: 14-19.
- Naukinov, D.N. 1982. [The Steppe Eagle (*Aquila nipalensis orientalis*) in southeastern Europe]. *Ornitologia* 17: 137-142. In Russian.
- Naukinov, D.N. 1984. Distribution, migra-

- tion and wintering of the Rough-legged Buzzard *Buteo lagopus* in Bulgaria. In: Meyburg & Chancellor 1994a.
- Narotji, R.K. 1985. Notes on some common breeding raptors of the Rajpipla forest. *J. Bombay Nat. Hist. Soc.* 82: 278-308.
- Narotji, R.K. 1991. Shikra *Accipiter badius* taking carrion. *J. Bombay Nat. Hist. Soc.* 88: 447-448.
- Narotji, R.K. & Monga, S.G. 1983. Observations of the Crested Serpent Eagle (*Spilornis cheela*) in Rajpipla forests, south Gujarat. *J. Bombay Nat. Hist. Soc.* 80: 273-285.
- Narovsky, I. & Di Giacomo, A.G. 1993. Las aves de la provincia de Buenos Aires. distribución y estatus. Asociación Ornitológica del Plata. Buenos Aires.
- Narovsky, I. & Yaurieta, D. 1993. Birds of Argentina and Uruguay. Vázquez Mazzini, Buenos Aires.
- Narovsky, T., Baharskas, M. & Lamin, B.I. 1992. Hallazgo del primer nido de Halconito Gris (*Spizopteryx circumcinctus*) en Buenos Aires. *Hornos* 13(3): 246-247.
- Natorp, J.C. 1986. Relations entre le Pastoralisme et les Populations de Vautours fauves (*Cops falvus*) sur le Versant Nord-Pyrénéen du Pays Basque (étude préliminaire). Thèse Vétérinaire, Nantes.
- Navas, J.R. & Bó, N.A. 1988. Aves nuevas o poco conocidas de Misiones, Argentina. II. *Com. Zool. Mus. Hist. Nat. Montevideo* 12(166): 1-9.
- Navas, J.R. & Bó, N.A. 1991. Aves nuevas o poco conocidas de Misiones, Argentina, IV. *Revista Mus. Arg. Cienc. Nat. R.R.* 15(8): 95-105.
- Nechaev, V.A. 1988. [Results of the winter census of the Steller's Sea Eagle on Sakhalin in 1986, the first international census]. Pp. 120-121 in: Litvinenko 1988. In Russian.
- Negro, J.J. 1991a. Iniciativas para la conservación del Cernicalo Primilla en Andalucía. *Quercus* 59: 16-21.
- Negro, J.J. 1997. *Falco naumanni* Lesser Kestrel. *BWP Update* 1: 49-56.
- Negro, J.J. & Hiraldo, F. 1992. Sex ratios in broods of the Lesser Kestrel *Falco naumanni*. *Ibis* 134(2): 190-191.
- Negro, J.J. & Hiraldo, F. 1993. Nest site selection and breeding success in the Lesser Kestrel *Falco naumanni*. *Bird Study* 40: 115-119.
- Negro, J.J. & Hiraldo, F. 1994. Lack of allozyme variation in the Spanish Imperial Eagle *Aquila adalberti*. *Ibis* 136(1): 87-90.
- Negro, J.J., Ghasin, A. & Bird, D.M. 1994. Effects of short-term food deprivation on growth of hand-reared American Kestrels. *Condor* 96(5): 744-760.
- Negro, J.J., Donazar, J.A. & Hiraldo, F. 1992. Kleptoparasitism and cannibalism in a colony of Lesser Kestrels. *J. Raptor Res.* 26: 225-228.
- Negro, J.J., Donazar, J.A. & Hiraldo, F. 1992. Copulatory behaviour in a colony of Lesser Kestrels: sperm competition and mixed reproductive strategies. *Anim. Behav.* 43: 921-930.
- Negro, J.J., Donazar, J.A. & Hiraldo, F. 1993. Home range of Lesser Kestrel (*Falco naumanni*) during the breeding season. Pp. 144-150 in: Nicholls & Clarke 1993.
- Negro, J.J., de la Riva, M. & Bustamante, J. 1991. Patterns of winter distribution and abundance of Lesser Kestrels (*Falco naumanni*) in Spain. *J. Raptor Res.* 25: 30-35.
- Nelson, R.W. & Myres, T.M. 1976. Declines in populations of Peregrine Falcons and their seabird prey at Lanagara Island, British Columbia. *Condor* 78: 281-293.
- Neubauer, M. 1991. 20 Jahre Sbrbreiadlerkontrolle einer Teilpopulation in Vorpommern. *Populationsök. Greifvögel u. Eulenarten* 2: 157-140.
- Neufeldt, I.A. 1964. Notes on the nidification of the Pied Harrier *Circus melanoleucos* (Pennant), in Amurland, USSR. *J. Bombay Nat. Hist. Soc.* 64: 284-306.
- Newby, J.E. 1981. Notes on the Lanner *Falco biarmicus* from the Tenere Desert, with comments on the incidence of scorpion predation by raptors. *Malmibus* 3: 55.
- Newgrain, K., Olsen, P.D., Green, B., Mooney, N.J., Brothers, N. & Bartos, R. 1993a. Food consumption rates of free-living raptor nestlings. In: Olsen 1993a.
- Newgrain, K., Green, B., Olsen, P.D., Brothers, N. & Mooney, N.J. & Bartos, R. 1993b. Validation of 22-sodium turnover for the estimation of food consumption and energy requirements of some captive Australian raptors. In: Olsen 1993a.
- Newman, K.B. 1969. Some notes on the feeding habits of the Lammergeyer *Cypoptus barbatus*. *Bokmakere* 21(4): 84-87.
- Newman, K.B. 1970. Display of male Secretary Bird. *Witwatersand Bird Club News Sheet* 69: 17.
- Newton, I. 1976. Breeding of Sparrowhawks (*Accipiter nisus*) in different environments. *J. Anim. Ecol.* 45: 831-849.
- Newton, I. 1978. Feeding and development of Sparrowhawk *Accipiter nisus*. *J. Zool., London* 184: 465-487.
- Newton, I. 1979. *Population Ecology of Raptors*. T. & A. D. Poyser, London.
- Newton, I. 1985b. Lifetime reproductive output of female Sparrowhawks. *J. Anim. Ecol.* 54: 241-253.
- Newton, I. 1986. *The Sparrowhawk*. T. & A. D. Poyser, Calton.
- Newton, I. 1988. A key factor analysis of Sparrowhawk populations. *Orologia* 76: 588-596.
- Newton, I. 1991. Habitat variation and population regulation in Sparrowhawks. *Ibis* 133(Suppl. 1): 76-88.
- Newton, I. & Chancellor, R.D. 1985. *Conservation Studies on Raptors. Proceedings of the II World Conference on Birds of Prey*, Thessaloniki, Greece, April 1982. ICBP Technical Publication 5.
- Newton, I. & Haas, M.B. 1984. The return of the Sparrowhawk. *British Birds* 77: 47-70.
- Newton, I. & Haas, M.B. 1988. Pollutants in Merlin eggs and their effects on breeding. *British Birds* 81: 258-269.
- Newton, I. & Marquiss, M. 1976. Occupancy and success of nesting territories in the European Sparrowhawk. *J. Raptor Res.* 10: 65-71.
- Newton, I. & Marquiss, M. 1979. Sex ratio among nestlings of the European Sparrowhawk. *Amer. Naturalist* 113: 309-315.
- Newton, I. & Marquiss, M. 1981. Effect of additional food on laying dates and clutch sizes of Sparrowhawks. *Ornis Scand.* 12: 224-229.
- Newton, I. & Marquiss, M. 1982a. Eye colour, age and breeding performance in Sparrowhawks. *Bird Study* 29: 195-200.
- Newton, I. & Marquiss, M. 1982b. Fidelity to breeding area and mate in Sparrowhawks (*Accipiter nisus*). *J. Anim. Ecol.* 51: 327-341.
- Newton, I. & Marquiss, M. 1982c. Food, predation and breeding season in Sparrowhawks (*Accipiter nisus*). *J. Zool., London* 197: 221-240.
- Newton, I. & Marquiss, M. 1982d. Molt in the Sparrowhawk. *Auk* 70: 163-172.
- Newton, I. & Marquiss, M. 1983. Dispersal of Sparrowhawks between birth place and breeding place. *Bird Study* 30.
- Newton, I. & Marquiss, M. 1984. Seasonal trend in the breeding performance of Sparrowhawks. *J. Anim. Ecol.* 53: 809-829.
- Newton, I. & Marquiss, M. 1986. Population regulation in Sparrowhawks. *J. Anim. Ecol.* 55: 463-480.
- Newton, I. & Marquiss, M. 1991. Removal experiments and the limitation of breeding density in Sparrowhawks. *J. Anim. Ecol.* 60: 535-544.
- Newton, I. & Moss, D. 1986. Post-fledging survival of Sparrowhawks *Accipiter nisus* in relation to mass, brood size and brood composition at fledging. *Ibis* 128: 73-80.
- Newton, I., Bell, A.A. & Wyllie, J. 1981a. Mortality of Sparrowhawks and Kestrels. *British Birds* 75: 195-204.
- Newton, I., Davis, P.E. & Davis, J.E. 1982. Ravens and Buzzards in relation to sheep-farming and forestry in Wales. *J. Appl. Ecol.* 19: 681-706.
- Newton, I., Davis, P.E. & Moss, D. 1981b. Distribution and breeding of Red Kites in relation to land-use in Wales. *J. Appl. Ecol.* 18: 173-186.
- Newton, I., Marquiss, M. & Moss, D. 1970. Habitat, female age, organo-chlorine compounds and breeding of European Sparrowhawk. *J. Appl. Ecol.* 16: 777-793.
- Newton, I., Marquiss, M. & Moss, D. 1981c. Age and breeding in Sparrowhawks. *J. Anim. Ecol.* 50: 839-853.
- Newton, I., Marquiss, M. & Rothery, P. 1983a. Age structure and survival in a Sparrowhawk population. *J. Anim. Ecol.* 52: 591-602.
- Newton, I., Marquiss, M. & Village, A. 1983b. Weights, breeding and survival in European Sparrowhawks. *Auk* 100: 344-354.
- Newton, S.F. & Shobrak, M. 1993. The Lappet-face Vulture *Torgus tracheliotes* in Saudi Arabia. Pp. 111-117 in: Wilson 1993.
- Nichol, W. 1963. Observations on the nesting of the South African Marsh Harrier. *Bokmakere* 14: 32-34.
- Nicholls, M.K. & Clarke, R. eds. 1993. *Biology and Conservation of Small Falcons: Proceedings of the 1991 Hawk & Owl Trust Conference, September 1991, Canterbury*. The Hawk & Owl Trust, London.
- Nichols, J.D., Hensler, G.L. & Sykes, P.W. 1980. Demography of the Everglade Kite: implications for population management. *Ecol. Modeling* 9(3): 215-232.
- Nicholson, J.D. 1926. Nesting habits of the Everglade Kite in Florida. *Auk* 43: 62-67.
- Nieboer, E. 1973. Geographical and Ecological Differentiation in the Genus *Circus*. PhD dissertation. Free University, Amsterdam, Netherlands.
- Nielsen, B.P. 1983. [Migratory behaviour and dispersal of Danish Kestrels *Falco*

- innunculus*] *Dan. Orn. Faun. Tidssk.* 77: 1-12. In Danish.
- Nielsen, B.P. & Christensen, S. 1969. On the autumn migration of Spotted Eagles and buzzards in the Middle East. *Ibis* 111: 620-621.
- Nielsen, O.K. & Cade, T.J. 1990a. Annual cycle of the Gyrfalcon in Iceland. *Nord Geogr. Rev.* 19: 41-62.
- Nielsen, O.K. & Cade, T.J. 1990b. Seasonal changes in food habits of Gyrfalcons in NE Iceland. *Ornis Scand.* 21: 202-211.
- Nielsen, O.K. & Petursson, G. 1993. Population fluctuations of Gyrfalcons and Rock Ptarmigan: analysis of export figures from Iceland. *Oecologia*.
- Nikitina, Ye.Yu. 1991. [On the biology of the Imperial Eagle in the Central Caucasus]. Pp. 119-120 in: Materials of the 10th All-union Orn. Conf. Book 2, Part 2. Nauka i tekhnika, Minsk. In Russian.
- Nikolaus, G. 1987. *Distribution Atlas of Sudan's Birds with Notes on Habitat and Status*. Bonner zoologische Monographien 25: Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn.
- Nilsson, J.N., von Schantz, T. 1982. The reversed size dimorphism in birds of prey—a reply. *Oikos* 38(3): 388.
- Nishida, T. 1979. Breeding records of Eastern Marsh Harrier *Circus aeruginosus japonicus* in the Hachirogata reclaimed land, Akita Prefecture. *J. Yamashina Inst. Orn.* 112: 31-32.
- Noble, D.G. & Elliott, J.F. 1990. Levels of contaminants in Canadian raptors, 1986 to 1988: effects and temporal trends. *Can. Field-Nat.* 104: 222-245.
- Noet, H. & Sechet, H. 1983. Survival of Danish Kestrels *Falco tinnunculus* in relation to protection of birds of prey. *Ornis Scand.* 14: 104-114.
- Nogué, G. 1982. *Le Vautour fauve, sa reproduction dans la Réserve Naturelle d'Osson, et son alimentation*. Publ. Parc National des Pyrénées occidentales.
- Norberg, R. 1987. Evolution, structure and ecology of northern forest owls. In Norn, R.W. et al. (eds) *Biology and Conservation of Northern Forest Owls*. USDA Forest Service, Fort Collins.
- Norgath, C. & Lashbey, J. 1953. Jackal Buzzards. *Ostrich* 24: 33-36.
- North, M.E.W. 1944. Some East African birds of prey. *Ibis* 86: 117-138.
- North, M.E.W. 1947. Breeding of the Egyptian Vulture in Kenya Colony. *Ibis* 89: 662-663.
- North, M.E.W. 1948. The Lammergeyer in Kenya Colony. *Ibis* 90: 138-141.
- Novelletto, A. & Petretti, F. 1980. Ecologia dell'Aquila reale negli Appennini. *Rivista Italiana di Ornitologia* 50: 127-142.
- Nugent, P.E., Escribar, J., Comradi, E. & Walters, C.E. 1989. Swallow-tailed Kites capture a bat and rough green snakes. *Chat* 53(4): 91-92.
- O'Connell, R. 1982. Habitat occupancy and regulation of clutch size in the European Kestrel *Falco tinnunculus*. *Bird Study* 29: 17-26.
- Oatley, T.B., Ouballeus, H.D., Navarro, R.D. & Underhill, I.G. 1998. *Review of ring-necked pheasants of birds of prey in southern Africa, 1948-1998*. Endangered Wildlife Trust, Johannesburg.
- Odjé, T. & Sondell, J. 1976. Reproductive success of Ospreys in southern and central Sweden. *Ornis Scand.* 7: 71-84.
- Ogden, J.C. 1974. The Short-tailed Hawk in Florida. *Auk* 91(1): 95-110.
- Ogden, J.C. 1975. Effects of Bald Eagle territoriality on nesting Osprey. *Wilson Bull.* 87: 196-205.
- Ogden, V.T. & Hornocker, M.G. 1977. Nesting density and success of Prairie Falcons in south-western Idaho. *J. Wildl. Manage.* 41: 1-11.
- Ogilvie, M. & the Rare Breeding Birds Panel. 1999. Rare breeding birds in the United Kingdom in 1997. *British Birds* 92: 389-428.
- Olech, B. 1991. [Protection of birds of prey in the Kampinos National Park (Poland): present state and indications]. *Ornithologia Pragensis* 19(1): 65-80. In Polish with English summary.
- Oleendorf, R.R. 1973. *Ecology of the Nesting Birds of Prey of Northwestern Colorado*. US Inter. Biol. Program, Grassland Biome, Fort Collins, Colorado, Tech. Rep. 211.
- Oleendorf, R.R. 1975. *Golden Eagle Country*. Alfred A. Knopf, New York.
- Oleendorf, R.R. 1993. Status, Biology and Management of Ferruginous Hawks—a review. *Raptor Res. and Tech. Assist. Center Ornith. Pap.* 1. US Bureau of Land Management, Boise, Idaho.
- Oliphant, L.W. 1985. North American Merlin breeding waves. *J. Raptor Res.* 19: 37-41.
- Oliphant, L.W. & Haug, F.A. 1985. Productivity, population density, and rate of increase in an expanding Merlin population. *J. Raptor Res.* 19: 36-59.
- Olmos, F. 1990a. Harrier-like hunting behavior by a Crane Hawk *Circus caerulescens*. *Bull. Brit. Orn. Club* 110(4): 225-226.
- Olmos, F. 1990b. Nest predation of Plumbeous Iby by capuchin monkeys and Greater Black Hawk. *Wilson Bull.* 102(1): 163-170.
- Olrog, C.C. 1949. La avifauna del Arroyo. *Acta Zool. Lilloana* 7: 139-159.
- Olrog, C.C. 1979. Alarmante escasez de rapaces en el sur argentino. *Hornos* 12: 82-84.
- Olrog, C.C. 1985. Status of wet forest raptors in northern Argentina. Pp. 191-197 in: Newton & Chancellor 1985.
- Olsen, J. 1994. *Some time with Eagles and Falcons*. University of Canberra, Canberra.
- Olsen, J. 1997. Notes on Santolud's Sea-eagle *Haliaeetus sanfordi* and other raptors in the Solomon Islands. *Aust. Bird Watcher* 17: 81-86.
- Olsen, J. & Georges, A. 1993. Do Peregrine Falcon fledglings reach independence during peak abundance of their main prey? *J. Raptor Res.* 27: 149-153.
- Olsen, J. & Olsen, P.D. 1980. Alleviating the impact of human disturbance on the breeding Peregrine Falcon. II. Public and recreational lands. *Condor* 4: 54-57.
- Olsen, J. & Olsen, P.D. 1981. Natural breeding of *Accipiter fasciatus* in captivity, with notes on the release of young. *J. Raptor Res.* 15: 53-57.
- Olsen, J. & Stevenson, F. 1996. Female Peregrine Falcon *Falco peregrinus* replaces an incubating female and raises her young. *Aust. Bird Watcher* 16: 205-210.
- Olsen, J., Olsen, P.D., Billew, T. & Jolly, J. 1993. Observations on the breeding diet of the Peregrine Falcon in South Australia. In: Olsen 1993a.
- Olsen, P.D. 1982. Ecogeographic and temporal variation in the eggs and nests of the Peregrine, *Falco peregrinus* (Aves, Falconidae), in Australia. *Aust. Wildl. Res.* 9: 277-298.
- Olsen, P.D. 1991. Aspects of the Evolutionary Ecology of Reproduction of Raptors. PhD thesis, Australian National University, Canberra.
- Olsen, P.D. ed. 1993a. *Australian Raptor Studies*. Australasian Raptor Association, RAOA, Melbourne.
- Olsen, P.D. ed. 1993b. *Birds of Prey of Australia*. Australian Museum and Angus & Robertson, Sydney.
- Olsen, P.D. & Cockburn, A. 1991. Female-biased sex allocation in Peregrine Falcons and other raptors. *Behav. Ecol. Sociobiol.* 28: 417-423.
- Olsen, P.D. & Cockburn, A. 1993. Do large females lay small eggs? Sexual dimorphism and the allometry of egg and clutch volume. *Oikos* 69: 447-455.
- Olsen, P.D. & Marples, J.G. 1992. Alteration of the clutch size of raptors in response to a change in prey availability: evidence from control of a broad-scale rabbit infestation. *Wildl. Res.* 19: 129-135, 507.
- Olsen, P.D. & Marples, J.G. 1993. Geographic variation in egg size, clutch size and date of laying of Australian raptors (Falconiformes and Strigiformes). *Emu* 93: 167-179.
- Olsen, P.D. & Olsen, J. 1978. Alleviating the impact of human disturbance on the breeding Peregrine Falcon. I. Ornithologists. *Condor* 2: 1-7.
- Olsen, P.D. & Olsen, J. 1979. Eggshell thinning in the Peregrine, *Falco peregrinus* (Aves, Falconidae), in Australia. *Aust. Wildl. Res.* 6: 217-220.
- Olsen, P.D. & Olsen, J. 1980a. Observations on defence of the nest against humans by Australian species of *Falco*. *Emu* 80: 165-165.
- Olsen, P.D. & Olsen, J. 1980b. Observations on development, nesting chronology, and clutch and brood size in the Australian kestrel, *Falco tinnunculus* (Aves, Falconidae). *Aust. Wildl. Res.* 7: 247-255.
- Olsen, P.D. & Olsen, J. 1985. A natural hybridization of the Brown Goshawk *Accipiter fasciatus* and Grey Goshawk *Accipiter novaehollandiae* in Australia, and a comparison of the two species. *Emu* 85: 250-256.
- Olsen, P.D. & Olsen, J. 1986. Distribution, status, movements and breeding of the Grey Falcon *Falco hypoleucos*. *Emu* 86: 47-51.
- Olsen, P.D. & Olsen, J. 1987a. Estimating the age of nestling raptors. *Aust. Bird Watcher* 12: 130-131.
- Olsen, P.D. & Olsen, J. 1987b. Movements and measurements of the Australian Kestrel *Falco tinnunculus*. *Emu* 87: 36-41.
- Olsen, P.D. & Olsen, J. 1987c. Egg weight loss during incubation in captive Australian Kestrels *Falco tinnunculus* and Brown Goshawks *Accipiter fasciatus*. *Emu* 87: 196-199.
- Olsen, P. & Olsen, J. 1987. The kestrel: Australia's smallest falcon. *Aust. Nat. Hist.* 22(6): 284-288.
- Olsen, P.D. & Olsen, J. 1988. Breeding of the Peregrine Falcon *Falco peregrinus*. I. Weather, nest, spacing and territory occupancy. *Emu* 88: 195-201.
- Olsen, P.D. & Olsen, J. 1989a. Breeding of the Peregrine Falcon *Falco peregrinus*. II. Weather, nest quality and the timing of laying. *Emu* 89: 1-5.
- Olsen, P.D. & Olsen, J. 1989b. Breeding of the Peregrine Falcon *Falco peregrinus*. III. Weather, nest quality and breeding success. *Emu* 89: 6-14.

- pygargus* (L.). XIII Conv. S.I.E., 25-27 v. Perugia. *Ethology, Ecology & Evolution* 2: 321.
- Parellada, X. 1984a. Contribució a la identificació del Trencalós (*Gypstus barbatus*). Pp. 13-15 in: CRPR 1984. Rapinyaires Mediterranis II. Centre de Recerca i Protecció de Rapinyaires, Barcelona, Spain.
- Parellada, X. 1984b. Variació dels plomatges i identificació de l'àliga cuabarrada (*Hiernaetus fasciatus*). Pp. 70-79 in: CRPR 1984. Rapinyaires Mediterranis II. Centre de Recerca i Protecció de Rapinyaires, Barcelona, Spain.
- Parker, T.A. & Carr, J.L. (eds) 1992. *Status of forest remnants in the Cordillera de la Costa and adjacent areas of southwestern Ecuador (Rapid Assessment Program)*. Washington, DC: Conservation International.
- Parker, J.W. 1976. Pesticides and eggshell thinning in the Mississippi Kite. *J. Wildl. Manage.* 40: 243-248.
- Parker, J.W. 1977. A second record of the Mississippi Kite in Guatemala. *Auk* 94: 1068-1069.
- Parker, J.W. 1984. Status report: the American Swallow-tailed Kite. *Falcon* 7: 12-13.
- Parker, J.W. & Ogden, J.C. 1979. The recent history and status of the Mississippi Kite. *Amer. Birds* 33: 119-129.
- Parker, J.W. & Ports, M. 1982. Yearling Mississippi Kite helpers at nests. *J. Raptor Res.* 16: 14-17.
- Parker, M. 1990. Reproductive biology, home range, and prey studies of the Laughing Falcon (*Herpetotheres cachinnans*). Pp. 159-171 in: Burnham *et al.* 1990.
- Parker, M. 1991a. The breeding biology and diet of Laughing Falcons (*Herpetotheres cachinnans*) in pristine and modified tropical forest habitats. Pp. 115-120 in: Whitacre *et al.* 1991.
- Parker, M. 1991b. Diet and hunting behavior at four Bat Falcon (*Falco rufigularis*) nests in primary lowland tropical forest. Pp. 135-135 in: Whitacre *et al.* 1991.
- Parker, M. 1993. Dietary and energetic analysis of Bat Falcon pairs during the breeding season in Tikal, Guatemala. *J. Raptor Res.* 27(1): 78.
- Parker, T.A., Stotz, D.F. & Fitzpatrick, J.W. 1996. Ecological and distributional databases. Pp. 115-436 in: Stotz *et al.* (eds) 1996.
- Parker, T.A. & O'Neill, J.P. 1980. Notes on little known birds of the Upper Uryumbamba Valley, Southern Peru. *Auk* 97(1): 167-176.
- Parker, T.A., Parker, A. & Pletuge, M.A. 1982. *An Annotated Checklist of Peruvian Birds*. Butco Books, Vermillion, South Dakota.
- Parker, T.A., Remsen, J.V. & Heindel, J.A. 1980. Seven bird species new to Bolivia. *Bull. Brit. Orn. Club* 1002: 160-162.
- Parker, T.A., Schulenberg, T.S., Graves, G.R. & Braun, M.J. 1985. The avifauna of the Huancabamba region, northern Peru. Pp. 169-197 in: Buckley *et al.* 1985.
- Parker, V. 1994. *Swaziland bird atlas 1985-1991*. Webster's, Mbabane.
- Parker, V. 1989. *The atlas of birds of Sul do Save, southern Mozambique*. Avian Demography Unit and Endangered Wildlife Trust: Cape Town & Johannesburg.
- Parkes, K.C. 1958. Specific relationships in the genus *Flanus*. *Auk* 60: 139-140.
- Parkes, K.C. 1971. Taxonomic and distributional notes on Philippine birds. *Nomina* 4.
- Parkes, K.C. 1973. Annotated list of the birds of Leyte Island, Philippines. *Nomina* 11.
- Parmalee, P.W. 1954. The vultures, their movements, economic status and control in Texas. *Auk* 71: 443-453.
- Parmalee, P.W. & Parmalee, B. 1967. Results of banding studies of Black Vultures in eastern North America. *Condor* 69: 146-153.
- Parr, S.J. 1985. The breeding ecology and diet of the Hobby *Falco subbuteo* in southern England. *Ibis* 127: 60-73.
- Parr, S.J. 1991. Occupation of new conifer plantations by Merlins in Wales. *Bird Study* 38: 103-111.
- Parr, S., Collin, P., Silk, S., Wilbraham, J., Williams, N.P. & Yarat, M. 1995. A baseline survey of Lesser Kestrels *Falco naumanni* in central Turkey. *Ibid. Cons.* 72: 45-53.
- Parrish, J.R., Stoddard, J. & White, C.M. 1987. Sexually mosaic plumage in female American Kestrel. *Condor* 89: 911-913.
- Partridge, W.H. 1961. *Accipiter pectoralis*, a synonym of *Accipiter poliogaster*. *Condor* 63: 505-506.
- Parumomo, O. 1987. La reproducción de l'Épervier (*Accipiter nisus*) en Corse. Pp. 177-184 in: Barcetti & Spagnesi 1987.
- Pattee, O.H. 1987. The role of lead in condor mortality. *Endangered Species Bull.* XII(9): 6-7.
- Paul, D. 1991. Foraging and breeding behaviour of the Australian Kestrel *Falco senegalensis* on the Northern Tablelands of New South Wales. *Aust. Bird Watcher* 11(3): 85-92.
- Paulson, D.R. 1973. Predator polymorphism and apostatic selection. *Evolution* 27: 269-277.
- Pavez, E.F., González, C.A. & Jiménez, J.F. 1992. Diet shifts of Black-chested Eagles (*Geranoaetus melanoleucus*) from native prey to European rabbits in Chile. *J. Raptor Res.* 26(1): 27-32.
- Paxton, M. & Brown, C. 1987. Rednecked falcons nesting in palm trees in Namibia. *Gabon* 2: 12-13.
- Paz, U. 1987. *The Birds of Israel*. Christopher Helm, Bromley, Kent, UK.
- Peula, S. 1991. Fine Bodenbrut des Schreiadlers *Aquila pomarina*. Pp. 259-264 in: Chancellor & Meyburg 1991.
- Peakall, D.B. & Kiff, L.F. 1979. Eggshell thinning and DDE residue levels among Peregrine Falcons *Falco peregrinus*: a global perspective. *Ibis* 121(2): 200-204.
- Peakall, D.B. & Kiff, L.F. 1988. DDE contamination in Peregrines and American Kestrels and its effects on reproduction. Pp. 357-350 in: Cade *et al.* 1988.
- Peartman, M. 1993b. Some range extensions and five species new to Colombia, with notes on some scarce or little known species. *Bull. Brit. Orn. Club* 113: 66-75.
- Pearson, D.J. & Meadows, B.S. 1979. Lesser Spotted Eagle *Aquila pomarina* in Kenya during 1978-79, with comments on the identification of the species. *Vopros* 3: 48-53.
- Pearson, O.P. & Ralph, C.P. 1978. The diversity and abundance of vertebrates along an altitudinal gradient in Peru. *Mem. Mus. Hist. Nat. Javier Prado* 18.
- Peck, G.K. & James, R.D. 1983. *Breeding Birds of Ontario: Nidology and Distribution*. Vol. 1. Nonpasserines. Royal Ontario Museum, Toronto, Canada.
- Peckover, W.S. & Filewood, J.W.C. 1976. *Birds of New Guinea and Tropical Australia*. A.H. & A.W. Reed, Sydney.
- Pedler, L.F. 1976. Breeding and other notes on the Black-shouldered Kite. *S. Austr. Orn.* 27: 139-141.
- Peters, H.J. 1963. Einiges über den Waldfalken, *Micrastur semitorquatus*. *J. Orn.*, Leipzig 104: 357-364.
- Pendleton, B.C. ed. 1988. *Proceedings of the Western Raptor Management Symposium and Workshop*. National Wildlife Federation, Washington, D.C.
- Penny, M. 1968. Endemic birds of the Seychelles. *Oryx* 9: 267-273.
- Penny, M. 1974. *The Birds of Seychelles and the Outlying islands*. Collins, London.
- Pennycuik, C.J. 1972. Soaring behaviour and performance of some East African birds, observed from a motor-glider. *Ibis* 114: 178-218.
- Pennycuik, C.J. 1975. Mechanics of flight. Pp. 1-75 in: Farner, D.S. & King, J.R. (eds), *Avian Biology* 5.
- Pennycuik, C.J. 1976. Breeding of the Lappet-faced and White-headed Vultures (*Torgos tracheliotus* Forster and *Trigonoceps occipitalis* Burchell) on the Serengeti Plains, Tanzania. *East Afr. Wildl. J.* 14: 67-84.
- Pennycuik, C.J. 1983. Effective nest density of Ruppell's Griffon Vulture in the Serengeti-Rift Valley area of northern Tanzania. Pp. 172-184 in: Wilbur & Jackson 1983.
- Pennycuik, C.J. 1985. Flight. In: Campbell & Lack 1985.
- Pennycuik, C.J. & Scholey, K.D. 1984. Flight behaviour of Andean Condors *Vultur gryphus* and Turkey Vultures *Cathartes aura* around the Paracas Peninsula, Peru. *Ibis* 126: 253-256.
- Pennycuik, C.J., Fuller, M.R. & McAllister, L. 1989. Climbing performance of Harris' Hawks (*Parabuteo unicinctus*) with added load: implications for muscle mechanics and for radiotracking. *J. Exper. Biol.* 112: 17-29.
- Penzhorn, B.L. 1969. Golden Gate or Lanmergeiers. *Afr. Wildl.* 23: 289-298.
- Penzhorn, B.L. 1976. Grootwitvalke, Ratschenjakkabe. *Lanmaats* 4: 18-19.
- Pepler, D. 1991. Diet of the Hobby Falcon *Falco subbuteo* in the southwestern Cape. *Ostrich* 62: 74-75.
- Pepler, D. 1993. Diet and hunting behaviour of the European Hobby in Africa. Pp. 165-170 in: Nicholls & Clarke 1993.
- Pepper-Edwards, D.L. & Notley, E. 1991a. Plumage changes of a captive Black-breasted Buzzard *Hamirosta melanosternon*. *Condor* 13: 77-78.
- Pepper-Edwards, D.L. & Notley, E. 1991b. Observations of a captive Black-breasted Buzzard *Hamirosta melanosternon* using stones to break open eggs. *Aust. Bird Watcher* 14: 103-106.
- Pereu, F., Toso, S., Suric, G. & Apollonio, M. 1983. Initial data for a study on the status, distribution and ecology of the Griffon Vulture *Gyps fulvus fulvus* in the Krainer Archipelago, Yugoslavia. *Larus* 33-35: 99-134.
- Petdeck, A.C. 1960. Observations on the reproductive behaviour of the great skua or bonxie *Stercorarius skua skua* in Shetland. *Auk* 48: 111-136.
- Perea, J.L., Morales, M. & Velasco, J. 1990. El Alimoche (*Nesophron percnopterus*) en España. Población, Distribución,

- Problemática y Conservación. Colección Técnica. ICONA. Madrid.
- Peregrine Fund. 1997. Peregrine Fund Annual Report 1997. Boise, USA.
- Peregrine Fund. 1998. Peregrine Fund Annual Report 1998. Boise, USA.
- Perennou, C. 1989. L'Aigle de Bonelli. Edition Fonds d'Intervention pour les Rapaces (FIR). Saint Cloud, France.
- Perennou, C., Fily, M. & Cantournet, D. 1987. Note sur un cas de polyandrie chez le Vautour pérenopière *Neophron perennopertus*. *Alauda* 55: 73-75.
- Pererva, V.I. 1989. [On three species of eagles in need of protection according to the Red Data Book of the USSR]. *Publ. gos. kadastra zivot. mira USSR* 65-72. In Russian.
- Pererva, V.I. & Grashdankin, A.V. 1983. [Ecological and behavioural adaptations of the Steppe Eagle to power lines]. Pp. 42-45 in: [Ecology of birds of prey]. In Russian.
- Perez, C.A. 1990. A Harpy Eagle successfully captures an adult male red howler monkey. *Wilson Bull.* 102(3): 560-561.
- Pereyra, J.A. 1957. Contribución al estudio y observaciones ornitológicas de la zona norte de la gobernación de La Pampa. *Memorias del Jardín Zoológico* 7: 198-326.
- Pérez-Mellado, V., Bueno, J.M. & Arroyo, B. 1977. Comportamiento de *Hieraaetus fasciatus* en el nido. *Ardeola* 23: 81-102.
- Peter, H.U. & Zaunweil, J. 1982. [Population ecology of the Kestrel *Falco tinnunculus* in a colony near Jena]. *Ber. Voglwarte Hiddensee* 3: 5-17.
- Peters, J.I. 1934. *Check-list of Birds of the World*. Vol. 2. Museum of Comparative Zoology, Harvard University Press, Cambridge, Massachusetts.
- Peters, G. & Huterea, R. eds 1990. *Vertebrates in the Tropics*. Mus. Alexander Koenig, Bonn, Germany.
- Petersen, C.M. 1959. [Studies of the breeding biology of the Kestrel (*Falco tinnunculus* L.) in Copenhagen]. *Dan. Orn. Faun. Tidsskr.* 50: 154-159. In Danish with English summary.
- Petren, F. 1988. Notes on the behaviour and ecology of the Short-toed Eagle in Italy. *Le Grifone* 78: 261-286.
- Petrov, P.A. & Rozhkov, A.A. 1965. [Materials on the breeding and numbers of the Steppe Eagle in the southeastern steppes of the Kalmyk ASSR]. Pp. 103-108 in: *Materialy zool. sovescanijy po probleme Biol. osnovy rekonstrukcii racional'nogo ispol'zovanija i ochrany fauny juznoj zony Evropejskoj Casti SSSR*. Kishinev. In Russian.
- Petrov, T., Iankov, P., Darakchiev, A., Nikolov, K., Miches, I., Porfirov, I. & Miches, B. 1994. State of the Imperial Eagle (*Aquila heliaca* Savigny) in Bulgaria in the period between 1890 and 1993. In: *Meyburg & Chancellor 1994b*.
- Pettifor, R.A. 1983a. Seasonal variation, and associated energetic implications, in the hunting behaviour of the Kestrel. *Bird Study* 30: 201-206.
- Pettifor, R.A. 1983b. Territorial behaviour of Kestrels in arable fenland. *British Birds* 76: 206-211.
- Pettigrew, J.D. 1982. A note on the eyes of the Letter-winged Kite *Elanus scriptus*. *Emu* 82: 305-309.
- Petys, S.J. 1989. Goshawks: their Status, Requirements and Management. *Forestry Commission Bulletin* 81. HMSO.
- Pexton, I. 1915. Nesting of the White-tailed Kite at Sespe, Ventura County, California. *Condor* 17: 230-232.
- Phelps, W.H. & Phelps, W.H. 1958. Lista de las aves de Venezuela con su distribución. Tomo II, Part I. *Bol. Soc. Venez. Cienc. Nat.* 90: 1-317.
- Phillips, W.W.A. 1933. Some observations on the nesting of a pair of Ceylon Shikra Hawks (*Astur badius badius* Gmelin). *J. Bombay Nat. Hist. Soc.* 36: 509-511.
- Pickford, P., Pickford, B. & Tarboton, W.R. 1989. *Southern African Birds of Prey*. Struik, Cape Town.
- Pickwell, G.B. 1950. The White-tailed Kite. *Condor* 52: 221-239.
- Pickwell, G.B. 1952. Requiem for the White-tailed Kites of Santa Clara Valley. *Condor* 54(1): 44-45.
- Picozzi, N. 1978. Dispersion, breeding and prey of the Hen Harrier in Glen Dye, Kincardineshire. *Ibis* 120: 498-509.
- Picozzi, N. 1980. Food, growth, survival, and sex-ratio of nestling Hen Harriers, *Circus cyaneus*, in Orkney. *Ornis Scandin.* 11: 1-11.
- Picozzi, N. 1984. Sex ratio, survival and territorial behaviour of polygynous Hen Harriers (*Circus c. cyaneus*) in Orkney. *Ibis* 126: 356-365.
- Picozzi, N. & West, D.N. 1976. Dispersal and causes of death in Buzzards. *British Birds* 69: 193-201.
- Piechocki, R. 1982. Der Turmfalke (*Falco tinnunculus*). Neue Stehm Bucherei-Heft 116(6). A. Ziemsen Verlag, Wittenberg Lutherstadt.
- Piechocki, R. 1991. *Der Turmfalke*. Ziemsen Verlag, Wittenberg Lutherstadt.
- Piechocki, R., Stubbe, M., Uhlenhaut, K. & Sunjaa, D. 1981. Beiträge zur Avifauna der Mongolei. *Mitt. Zool. Mus. Berlin* 57(Suppl. Ann. Orn. 5): 71-128.
- Pierre, R. & Maloney, R. 1989. Responses of the Harrier in the Mackenzie Basin to the abundance of rabbits. *Notornis* 36: 114-116.
- Pineau, J. & Giraud-Audine, M. 1977. Sur les oiseaux nicheurs de l'extrême nord-ouest du Maroc: reproduction et mouvements. *Alauda* 45: 75-103.
- Pinoski, J. 1961. The food of the Marsh Harrier (*Circus aeruginosus* L.). *Ekol. Polska* 7: 55-60.
- Pinto, A.A. da Rosa 1983. *Ornitologia de Angola*. Vol. 1. *Non Passera*. Instituto de Investigação Científica Tropical, Lisboa.
- Piper, S.F. 1994. Mathematical demography of the Cape Vulture. Witswatersrand University (MSc thesis).
- Piper, S.F. 1989. Predation attempts by African Goshawks. *Gabon* 4: 24-26.
- Piper, S.F. & Ruddle, P. 1986. An initial evaluation of the Cape Vulture colonies at Mkhambath, Transkei. *Vulture News* 15: 7-12.
- Pitman, C.R.S. 1966. A further note on the breeding of the African Hobby *Falco rufiger* Smith. *Ostrich* 37: 6-7.
- Pizzev, G. 1958. *A Time to Look*. Heinemann, Melbourne.
- Platt, J.B. 1976a. Bald Eagles wintering in a Utah desert. *Amer. Birds* 30: 783-788.
- Platt, J.B. 1976b. Gyrfalcon nest site selection and winter activity in western Canadian Arctic. *Canadian Field-Nat.* 90: 338-345.
- Platt, J.B. 1976c. Sharp-shinned Hawk nesting and nest site selection in Utah. *Condor* 78: 102-103.
- Platt, J.B. 1989. Gyrfalcon courtship and early breeding behaviour on the Yukon North Slope. *Sociobiology* 15: 43-69.
- Platt, S.W. 1977. Gyrfalcon in Oklahoma. *Bull. Oklahoma Orn. Soc.* 10: 27-28.
- Platt, S.W. 1978. Successful breeding of immature Prairie Falcons in northeast Colorado. *J. Raptor Res.* 11: 81-82.
- Pleasant, J. & Pleasants, B.Y.M. 1988. Reversal size dimorphism in raptors: evidence for how it evolved. *Oikos* 52(1): 129-135.
- Plotnick, R. 1956. Posición sistemática del género *Heterospizias*. *Hornorn* 10: 136-139.
- Pollard, J.R.T. 1947. The Bearded Vulture *Gypaetus meridionalis* Keyserling and Blasius, in Kenya Colony. *Ibis* 89: 120-122.
- Polo, D.J., Celdran, J.F., Peinado, V.I., Viscor, G. & Palomeque, J. 1992. Hematological values for four species of birds of prey. *Condor* 94(4): 1007-1013.
- Polushkin, D.M. 1988. [Population structure of rare birds species in Stolba Reservation and in nearby territories]. Pp. 170-176 in: *Shvetsov, Yu.G. ed. Redkoye nazemnyye faunozhivye Sibiri* [Rare terrestrial vertebrates of Siberia]. Nauka, Novosibirsk 1988. In Russian.
- Pomator, M. 1993. Lesser Kestrel recovery project in Catalonia. Pp. 24-28 in *Nicholls & Clarke R* (eds), 1993.
- Poole, A.F. 1985. Courtship feeding and Osprey reproduction. *Auk* 102: 479-492.
- Poole, A.F. 1989. *Ospreys: a Natural and Unnatural History*. Cambridge University Press, Cambridge, UK.
- Poole, A.F. & Agler, B. 1987. Recoveries of Ospreys banded in the United States, 1914-1984. *J. Wildl. Manage.* 51: 148-155.
- Poole, K.G. & Boag, D.A. 1989. Ecology of Gyrfalcons, *Falco rusticolus*, in the central Canadian Arctic: diet and feeding behavior. *Can. J. Zool.* 66: 334-344.
- Poole, K.G. & Bronley, R.G. 1988. Natural history of the Gyrfalcon in the Central Canadian Arctic. *Arctic* 41: 51-58.
- Porter, R.D. & White, C.M. 1973. The Peregrine Falcon in Utah: emphasizing ecology and competition with the Prairie Falcon. *Brigham Young Univ. Sci. Bull.* 18(4): 1-74.
- Porter, R.F. 1981. Ageing and sexing Rough-legged Buzzards. *Dutch Birding* 3: 79-80.
- Porter, R.F., Willis, J., Christensen, S. & Nielsen, B.P. 1981. *Flight Identification of European Raptors*. T. & A.D. Poyser, Berkhamstead.
- Porter, R.F., Christensen, S. & Schiermacker-Hansen, P. 1996. *Field Guide to the Birds of the Middle East*. T. & A.D. Poyser, London.
- Portnov, J.W. & Dodge, W.E. 1979. Red-shouldered Hawk nesting ecology and behavior. *Wilson Bull.* 91: 104-117.
- Poslawski, A.N. 1967. Der Steppenadler, sein Vorkommen in den Wüsten des nördlichen Kaspivorlandes. *Falke* 14: 156-158.
- Postupalsky, S. 1989. Osprey. Pp. 297-313 in: *Newton, I. ed. Lifetime Reproduction in Birds*. Academic Press, London.
- Potapov, E.R. 1994. Time budget, organochlorines and productivity in the Peregrine Falcon *Falco peregrinus* in the Khatma Lowlands region (north-eastern Siberia). In: *Meyburg & Chancellor 1994a*.
- Potapov, R.L. 1986. The birds of the Pammis. *Proc. Zool. Inst. Ar. Sci. USSR* 39: 1-119.
- Prater, N.S. 1953. The birds of Calicoan,

- Philippine Islands. *Wilson Bull.* 65: 252-270.
- Powers, I. R. 1981. Nesting Behavior of the Ferruginous Hawk (*Buteo regalis*). PhD thesis, Idaho State University, Pocatello, Idaho.
- Powers, I. R., Howard R. & Trost, C.H. 1975. Population status of the Ferruginous Hawk in southeastern Idaho and northern Utah. Pp. 153-157 in: Murphy, J.R., White, C.M. & Harrell, B.E. eds. 1975. *Population Status of Raptors*. Raptor Research Report 7 Raptor Research Foundation, Vermillion, South Dakota, USA.
- Prakash, V. 1994. Status, distribution and breeding biology of the Lesser Spotted Eagle in Keoladeo National Park. In: Meyburg & Chancellor 1994b.
- Prakash, V., Prakash, N.V. & Clark, W.S. 1993. Oriental Honey-buzzard *Pernis ptilorhynchus*: a new species for the Andaman Islands. *Forktail* 9: 156-157.
- Pratt, H.D., Brunet, P.L. & Bennett, D.G. 1987. *The Birds of Hawaii and the Tropical Pacific*. Princeton University Press, Princeton, New Jersey.
- Preston, C.R. & Beane, R.D. 1993. Red-tailed Hawk (*Buteo jamaicensis*). No. 52 in: Poole & Gill 1993.
- Preuthner, M. & Gamauf, A. 1998. A possible new subspecies of the Philippine Hawk Eagle (*Spiraeetus philippinus*) and its future prospects. *J. Raptor Research* 32: 126-135.
- Preston, C.R. 1980. Differential perch site selection in color morphs of the Red-tailed Hawk (*Buteo jamaicensis*). *Auk* 97: 782-789.
- Prevost, Y.A. 1983. The moult of the Osprey. *Ardea* 71: 199-209.
- Pric-Jones, H. 1983. *Australian Birds of Prey*. Doubleday, Sydney.
- Prigogine, A. 1985. Recently recognised bird species in the Afrotropical Region - a critical review. Pp. 91-114 in: Schuchmann 1985.
- Proud, D. 1949. Some notes on the birds of the Nepal valley. *J. Bombay Nat. Hist. Soc.* 48: 695-719.
- Prout-Jones, D.V. & Kemp, A.C. 1997. Moults, plumage sequence and maintenance behaviour of a captive male and female crowned eagle, *Nephelaietus coronatus* (Aves: Accipitridae). *Annals of the Transvaal Museum* 36(19): 239-252.
- Prout-Jones, D.V. & Milstein, P.L.S. 1986. Sequential moult with age-class establishment in the African Fish Eagle *Haliaeetus vocifer*. *S. Afr. J. Wildl. Res.* 16: 17-26.
- Prout-Jones, S.C., White, C.M. & Devine, W.R. 1981a. Breeding of the Peregrine Falcon in Victoria, Australia. *Emu* 80: 253-269.
- Prout-Jones, S.C., White, C.M. & Emsion, W.B. 1981b. Egg-shell thinning and organochlorine residues in eggs and prey of Peregrine Falcons from Victoria, Australia. *Emu* 80: 282-287.
- Prout-Jones, S.C., Prout-Jones, M.A. & Knight, R.I. 1980. The White-tailed Kite in North and Middle America: current status and recent population changes. *Amer. Birds* 34: 682-688.
- Pupals, J.J., Wall, J.W. & Wilcox, D.S. 1977. First record of the Pearl Kite in Panama. *Amer. Birds* 31(6): 1093-1100.
- Quednau, A. 1930. Schelladler am Mauerec. *Orn. Monatsber.* 58: 69-72.
- Quixchán, A.M., Ramirez, E.M. & Thorstrom, R.K. 1992. Reproductive biology, food habits, and home range of the Bicolored Hawk. Pp. 163-168 in: Whitacre & Thorstrom 1992.
- Rabenold, P.P. 1986. Family associations in communally roosting Black Vultures. *Auk* 103: 32-41.
- Rabenold, P.P. 1987a. Recruitment to food in Black Vultures: evidence for following from communal roosts. *Anim. Behav.* 35: 1775-1785.
- Rabenold, P.P. 1987b. Roost attendance and aggression in Black Vultures. *Auk* 104: 647-655.
- Rabor, D.S. 1958. Birds from Leyte. *Phil. J. Sc.* 66: 15-34.
- Rabor, D.S. 1977. *Philippine Birds & Mammals*. University of the Philippines Press, Quezon City.
- Radtke, F.U. & Klimosowski, J. 1977. Late fledging date for Harris' Hawk. *Wilson Bull.* 89: 469-470.
- Raffaele, H., Wiley, J., Garrido, O. & Raffaele, J. 1998. *Birds of the West Indies*. Christopher Helm, London.
- Ragless, G.B. 1958. Some notes on the Black-shouldered Kite. *S. Austr. Orn.* 22: 73-75.
- Raglew, G.B. 1995. Unusual nest-sites of the Wedge-tailed Eagle *Aquila audax*. *S. Austr. Ornithol.* 32: 61.
- Rahbek, C., Bloch, H., Poulsen, M.K. & Rasmussen, J.F. 1989. *Zoologisch-Museumische Expedition til Sydamerikas Andesbjerg 1989*. Zoological Museum, University of Copenhagen, Copenhagen.
- Ralls, K. 1976. Extremes of sexual dimorphism in size in birds. *Wilson Bull.* 88: 149-150.
- Ramakka, J.M. & Weywondac, R.T. 1995. Nesting ecology of the Ferruginous Hawk in northwestern New Mexico. *J. Raptor Res.* 27: 97-101.
- Rams, A. & Peña, C. 1988. Contribución al anidamiento del Gavilán Colilargo (*Accipiter gundlachi* sp.) en la región norte de las provincias orientales. *Garcinia* 13: 4.
- Rand, A.L. 1936. The distribution and habits of Madagascar birds: a summary of field notes of the Mission Zoologique Franco-Anglo-Américaine a Madagascar. *Bull. Amer. Mus. Nat. Hist.* 72: 143-499.
- Rand, A.L. 1942. Results of the Archbold Expeditions. No. 43. Birds of the 1938-1939 New Guinea expedition. *Bull. Amer. Mus. Nat. Hist.* 79: 425-515.
- Rand, A.L. 1952. Secondary sexual characters and ecological competition. *Feldiana Zoology* 34: 65-70.
- Rand, A.L. 1960. Races of the Short-tailed Hawk. *Auk* 77: 448-459.
- Rand, A.L. & Gilhard, E. T. 1967. *Handbook of New Guinea Birds*. Weidenfeld & Nicolson, London.
- Rand, A.L. & Rabor, D.S. 1960. *Birds of the Philippine Islands: Siquijor, Mount Malindang, Bohol and Samar*. Chicago Natural History Museum.
- Randla, T. 1994. Golden Eagle. In Leibak, E., Lilleleit, V. & Veroman, V (eds), *Birds of Estonia. Status, Distribution and Numbers*. Estonian Academy Publishers.
- Rands, M.R.W., Rands, G. & Porter, R. 1987. *Birds in the Yemen Arab Republic. Report of the Ornithological Society of the Middle East Expedition 1985*. ICBP, Cambridge.
- Rangel-Salazar, J.I. & Enriquez-Rocha, P.L. 1995. Nest record and dietary items for the Black Hawk-eagle (*Spiraeetus tyrannus*) from the Yucatán Peninsula. *J. Raptor Res.* 27: 121-122.
- Rasa, O.A.E. 1986. Nocturnal group flights of the Pale Chanting Goshawk (*Melierax cinereus poliopterus*) in the Taru Desert, Kenya. *Ostrich* 57: 191-192.
- Rasa, O.A.E. 1987. Patterns of intra-African small raptor spring migrations in the Taru Desert, Kenya. *Afr. J. Ecol.* 25: 165-171.
- Rasmussen, L.U. & Storgård, K. 1969. [The breeding of the Buzzard, Sparrowhawk, Goshawk, and Honey Buzzard in south-east Jutland, Denmark, 1973-1987]. *Dan. Orn. Foren. Tidssk.* 83: 23-34. In Danish with English summary.
- Rasmussen, P., Humphrey, P.S. & Muniz-Saavedra, J. 1992. Imperial Shags and other birds of the Lago General Vintter area, Chubut Province, Argentina. *Orn. Pap. Mus. Nat. Hist. Univ. Kansas* (146): 1-16.
- Rasmussen, P.C. & López, N. 1988. Notes on the status of some birds of Región X, Chile. *Bull. Brit. Orn. Club* 108(4): 154-159.
- Ratcliffe, D. 1995. *The Peregrine Falcon*. T. & A. D. Poyser, London.
- Rautenbach, I.L., Fenton, M.B., Kemp, A.C. & van Jaarsveld S.J. 1990. Home range and activity of African Goshawks *Accipiter tachiro* in relation to their predation on bats. *Koedoe* 3: 17-22.
- Raxworthy, C.J. & Colson, P.R. 1992. Conclusive evidence for the continuing existence of the Madagascar Serpent Eagle *Eutrochilus astur*. *Bull. Brit. Orn. Club* 112: 108-111.
- Rayner, J.M.V. 1988. Form and function in avian flight. *Curr. Orn.* 5: 1-66.
- Read, A. 1985. Predation of an arboreal rat by a New Zealand Falcon. *Nitori* 32: 155.
- Read, M. 1987. The Secretary Bird - aristocrat of the savannah. *Savann* 10: 13-14.
- Real, J. 1983. Dades sobre la biologia de l'Àliga cuabarrada (*Hieranetus fasciatus* Vieill.) a la Serra-llada Pre-litoral Catalana. *Bulleti Inst. Catalana de Hist. Nat.* 49(Sec. Zool. 5): 127-141.
- Real, J. 1987. Evolución cronológica del régimen alimenticio de una población de *Hieranetus fasciatus* en Catalunya: factores causantes, adaptación y efectos. Pp. 185-205 in: Baccetti & Spagnesi 1987.
- Redpath, S.M. 1991. The impact of Hen Harriers on Red Grouse breeding success. *J. Appl. Ecol.* 28: 659-671.
- Redpath, S.M. 1992. Behavioural interactions between Hen Harriers and their moorland prey. *Ornis Scand.* 23: 73-80.
- Reese, J. 1969. A Maryland Osprey population 75 years ago and today. *Maryland Birdlife* 25: 116-119.
- Reese, J. 1977. Reproductive success of Ospreys in central Chesapeake Bay. *Auk* 94: 202-221.
- Reichhoff, J. 1977. [Long term and seasonal changes in the abundance of the Kestrel]. *Anz. Orn. Ges. Bayern* 16: 191-196. In German.
- Reid, S.B. 1989. Flying behaviour and habitat preferences of the King Vulture *Sarcorhamphus papa* in the western Orinoco Basin of Venezuela. *Ibis* 131: 301-303.
- Reise, O. 1907. Das Dünenjunge vom Küttengeiet. *Vultur monachus* L. *Orn. Monat.* 32: 331-333.
- Reistetter, R. 1991. Eine Felsenbrut des

- sexual size dimorphism. *Auk* 110: 900-910.
- Scheffler, W.J. & van Rossem, A.J. 1944. Nesting of the Laughing Falcon. *Auk* 61: 141-142.
- Schiffner, A. 1967. Vom Zug schweizerischer und deutscher Schwarzer Milan *Milvus migrans* nach Ringfunden. *Orn. Beob.* 61: 54-51.
- Schipper, W.J.A. 1973. A comparison of prey selection in sympatric harriers, *Circus* spp., in Western Europe. *Geofaun* 63: 17-120.
- Schipper, W.J.A. 1977. Hunting in three European harriers (*Circus*) during the breeding season. *Ardea* 65: 55-72.
- Schipper, W.J.A. 1978. A comparison of breeding ecology in three European harriers. *Ardea* 66(3): 77-102.
- Schipper, W.J.A., Bourma, L.A. & Bowenbroek, P. 1975. Comparative study of wintering Hen Harriers *Circus cyaneus* and Marsh Harriers *Circus aeruginosus*. *Ardea* 63: 1-29.
- Schlatter, R.P., Yáñez, J.I. & Jaksic, F.M. 1980a. Food-niche relationships between Chilean eagles and Red-backed Buzzards in central Chile. *Auk* 97(4): 897-898.
- Schlatter, R.P., Toro, B., Yáñez, J.I. & Jaksic, F.M. 1980b. Prey of the White-tailed Kite in central Chile and its relationship to the hunting habitat. *Auk* 97(1): 186-190.
- Schler, M.A. 1987. Parade nuptiale et cérémonies de salut chez le Vautour pape *Sarcophaga papa* (L.). *C. R. Acad. Sci. Paris* (Ser. III, 9) 304: 207-212.
- Schmid, H. 1988. The status of the Kestrel in Switzerland. *Orn. Beob.* 87: 327-349.
- Schmitt, M.B., Baum, S. & von Maltitz, F. 1980. Observations on the Steppe Buzzard in the Transvaal. *Ostrich* 51: 151-159.
- Schmitt, M.B., Baum, S. & von Maltitz, F. 1982. Mensural data, moult and abundance of the Little Banded Goshawk *Accipiter badius* in the Transvaal, South Africa. *Ostrich* 53: 74-78.
- Schmitt, M.B., Baum, S. & von Maltitz, F. 1987. Observations on the Jackal Buzzard *Buteo rufifasciatus* in the Kato. *Ostrich* 58: 97-102.
- Schmidt-Bey, W. 1913. Neckerrien der Raubvögel nebst Gedanken über die Entstehung ihrer sekundären Geschlechtsunterschiede. *Ornith. Monatsheft*, 38: 400-416.
- Schmutz, F. 1977. *Die Vögel der Mangarai (Flores)*. F. Schmutz, Ruteng, Flores.
- Schmutz, J.K. 1977. Relationship Between Three Species of the Genus *Buteo* (Aves) Coexisting in the Prairie-parkland Ecotone of Southeastern Alberta. MSc thesis, University of Alberta, Calgary.
- Schmutz, J.K. 1984. Ferruginous and Swainson's Hawk abundance and distribution in relation to land use in southeastern Alberta. *J. Wildl. Manage.* 48: 1180-1178.
- Schmutz, J.K. 1987. Effect of agriculture on Ferruginous and Swainson's Hawks. *J. Range Manage.* 40: 138-140.
- Schmutz, J.K. & Fyfe, R.W. 1987. Migration and mortality of Alberta Ferruginous Hawks. *Condor* 89: 169-174.
- Schmutz, J.K. & Hungle, D.J. 1989. Population of Ferruginous and Swainson's Hawks increase in synchrony with ground squirrels. *Can. J. Zool.* 67: 2596-2601.
- Schmutz, J.K., Fyfe, R.W., Banasch, C. & Armbruster, H. 1991. Routes and timing of migration of falcons banded in Canada. *Wilson Bull.* 103: 44-58.
- Schmutz, S.M. & Oliphant, L.W. 1987. Chromosome study of Peregrine, Prairie, and Gyrfalcons with implications for hybrids. *J. Heredity* 78: 398-390.
- Schneider-Jacoby, M. 1994. Brutbestand des Seeadlers und des Schreiadlers in den Save-Auen (Kroatien). In: Meyburg & Chancellor 1994b.
- Schnell, G.D. 1967a. Population fluctuations, spatial distributions, and food habits of Rough-legged Hawks in Illinois. *Kansas Orn. Soc. Bull.* 18: 21-28.
- Schnell, G.D. 1967b. Environmental influence on the incidence of flight in the Rough-legged Hawk. *Auk* 84: 175-182.
- Schnell, G.D. 1968. Differential habitat utilization by wintering Rough-legged and Red-tailed Hawks. *Condor* 70: 373-377.
- Schnell, G.D. 1969. Communal roosts of wintering Rough-legged Hawks (*Buteo lagopus*). *Auk* 86: 682-690.
- Schnell, J.H. 1958. Nesting behavior and food habits of Goshawks in the Sierra Nevada of California. *Condor* 60: 377-403.
- Schnell, J.H. 1979. Black Hawk (*Buteo calurus*). In: Habitat Management Series for Unique or Endangered Species, Bureau Land Management Report 18. US Department of Interior.
- Schodde, R. 1977. Contributions to Papuan ornithology. VI. Survey of the birds of southern Bougainville Island, Papua New Guinea. *CNRO Div. Wildl. Res. Tech. Paper* 34.
- Schodde, R. 1978. The status of endangered Papuan Birds. Appendix, Pp. 133-145, 185-206 in: Iyle (ed) 1978.
- Schodde, R. 1993. Origins and evolutionary radiations in Australia's birds of prey [summary only]. In: Olsen 1993a.
- Schodde, R. & Mason, I.J. 1980. *Nocturnal Birds of Australia*. Lansdowne, Melbourne.
- Schodde, R. & Idemmann, S.C. eds. 1988. *Reader's Digest Complete Book of Australian Birds, Reader's Digest, Sydney.*
- Schoumacker, P. 1983. Observations on the nesting of the Black-chested Buzzard-Eagle (*Geranoaetus melanoleucus*) in Peru. *Condor* 85: 221-222.
- Schrader, S.W. 1985. Out of season breeding of the Spotted Harrier. *Austr. Birds* 19: 46-47.
- Schubart, O., Aguirre, A.C. & Sick, H. 1985. Contribuição para o conhecimento da alimentação das aves brasileiras. *Arg. Zool. São Paulo* 12: 95-249.
- Schubert, W. 1977. Brutaushulle beim Wespenbussard (*Pernis ptilorhynchus*) in Baden-Württemberg. *Anz. Orn. Ges. Bayern* 16: 171-175.
- Schulenberg, T.S. & Parker, I.A. 1981. Status and distribution of some northwest Peruvian birds. *Condor* 83: 200-216.
- Schulz, M. 1983. Nesting of the Square-tailed Kite in south-eastern New South Wales. *Austr. Birds* 18: 6-8.
- Schulz, M. 1987. Temporal variation in the frequency of vocalisations of the New Guinea Harpy Eagle. *Emu* 87: 257-258.
- Schust, G., Tinbergen, L. & Tinbergen, N. 1936. Ethologische Beobachtungen an Baumfalken (*Falco s. subbuteo* L.). *J. Orn.* 84: 387-433.
- Schwartz, P. 1972. *Micrastur ghibicollis*, a valid species sympatric with *M. ruficollis* in Amazonia. *Condor* 74: 399-415.
- Schwartzkopf, J. 1973. Mechanoreception. Pp. 417-477 in: Farner & King 1973.
- Scott, D.A. & Brooke, M. de L. 1985. The endangered avifauna of southeastern Brazil: a report on the BOC/WWF expedition of 1980-81 and 1981/82. Pp. 115-159 in: Diamond & Lovejoy 1985.
- Scott, J.A. 1985. Further notes on the breeding success of Long-crested Eagles *Lophoctes occipitalis*. *Ostrich* 54: 183-184.
- Scott, R.E. 1978. Rough-legged Buzzards in Britain in 1973/74 and 1974/75. *British Birds* 71: 325-338.
- Searle, R. 1992. Diet of the Secretarybird. *Witwatersrand Bird Club News Sheet* 158: 12.
- Searle, R. 1993. Cuckoo Hawks at Mia's Farm. *Witwatersrand Bird Club News Sheet* 158: 68.
- Seegar, J.K.D., Chandler, S.K., Fraser, J.D., Buehler, D.A. & Dean, D.J. 1994. Using a geographic information system to analyze Bald Eagle *Haliaeetus leucocephalus* habitat at Chesapeake Bay. In: Meyburg & Chancellor 1994a.
- Seibold, I., Helbig, A.J., Meyburg, B.-U., Negro, J.J. & Wink, M. 1994. Genetic differentiation and molecular phylogeny of European *Aquila* eagles (Aves: Falconiformes) according to cytochrome b nucleotide sequences. MS.
- Selander, R.K. 1966. Sexual dimorphism and differential niche utilization in birds. *Condor* 68: 118-151.
- Selander, R.K. 1972. Sexual selection and dimorphism in birds. pp. 180-250 in: Campbell (ed), 1972.
- Semenov, N.M., Agalov, A.V., Rezniko, D.S. & Rozkov, A.A. 1950. [Breeding and numbers of the Steppe Eagle in the steppes of the south of the Stalingrad area and the north of the Astrakhan area]. Pp. 159-163 in: *Geografija naselenija hozemnykh zivotnykh i metody ego izuceniya*. Izd-vo AN SSSR, Moscow. In Russian.
- Semenov, N.M., Agalov, A.V., Rezniko, D.S. & Rozkov, A.A. 1962. [The dependence of the distribution and numbers of the Steppe Eagle on the density of vultures in the Pribaltinsky steppes]. *Voprosy ornitologii*. Izd-vo Vyssjajj shola, Kiev 6: 132-133. In Russian.
- Serloutein, J.H. 1961. Vultures eat Ostrich eggs. *Fauna & Flora, Transvaal* 12: 89.
- Serle, W. 1939. Field observations on northern Nigerian birds. *Ibis* Ser. 14, no. 3: 659-660.
- Serle, W. 1943. Further field observations on northern Nigerian birds. *Ibis* 85: 264-300.
- Serle, W. 1950. A contribution to the ornithology of the British Cameroons. *Ibis* 92: 343-376.
- Serle, W. 1954. A second contribution to the ornithology of the British Cameroons. *Ibis* 96: 47-90.
- Serle, W., Motel, G.J. & Hartwig, W. 1977. *A Field Guide to the Birds of West Africa*. Collins, London.
- Sverringhaus, L.L. 1991. The status and conservation of Grey-laced Buzzard-eagles and Brown Shrikes migrating through Taiwan. Pp. 203-223 in: Salathé, 1991.
- Shank, C.C. & Poole, K.G. 1994. Status of the Gyrfalcon *Falco rusticolus* population in the Northwest Territories, Canada. In: Meyburg & Chancellor 1994a.
- Shank, C.C., Bromley, R.G. & Poole, K.G. 1993. Increase in breeding population of Tundra Peregrine Falcons in the central Canadian Arctic. *Wilson Bull.* 105: 188-190.

- Simmons, R. 1995a. Chance, choice and habitat-related breeding success in a dense population of Wahlberg's Eagle *Aquila wahlbergi*. Pp. 133-139 in: Wilson 1993.
- Simmons, R. 1995b. Effects of supplementary food on density-reduced breeding in an African eagle: adaptive restraint or ecological constraint? *Ibis* 135(4): 394-402.
- Simmons, R. 1995. Mass poisoning of Lappet-faced Vultures in Namibia. *J. Afr. Raptor Biol.* 10: 3.
- Simmons, R. 2000. *Harrers of the World: their Behaviour and Ecology*. Oxford University Press, Oxford.
- Simmons, R., Barnard, P.E. & Smith, P.C. 1987. Reproductive behaviour of *Circus cyaneus* in North America and Europe: a comparison. *Oriens Scand.* 18: 33-41.
- Simmons, R., Macwhirter, R.B., Barnard, P.E. & Hansen, G.L. 1986. The influence of microclimates on polygyny, productivity and provisioning of the Northern Harrier: a 5-year study. *Can. J. Zool.* 64: 2447-2456.
- Simonetti, J., Núñez, H. & Yáñez, J. 1982. *Falco sparverius*, rapaz generalista en Chile central (Aves: Falconidae). *Bol. Mus. Nac. Hist. Nat., Chile* 39: 119-124.
- Sinclair, J.C. & Dean, W.R.J. 1974. Grey Kestrel *Falco anatum*. *Ostrich* 43: 134.
- Sinclair, J.C. & Walters, B. 1976. Lanner Falcons breeding in Durban City. *Balmakere* 20: 51-52.
- Sinclair, J.C., Hockey, P.A.R. & Tarboton, W.R. 1993. *Savot Birds of Southern Africa*. Struik, Cape Town.
- Skinner, K.L. 1925. Details of some nests and eggs of the Black Vulture, *Aegypius monachus* (L.), from the Province of Cáceres, Spain. *Ool. Rev.* 5: 42-43.
- Skorupa, J.P. 1981. A breeding record for Cassin's Hawk Eagle *Hieronetus africanus*. *Scopus* 5: 52-54.
- Skutch, A.F. 1915. Migration of Swainson's Hawks through Costa Rica. *Northwest Sci.* 19: 80-89.
- Skutch, A.F. 1947. A nesting of the Plumbeous Kite in Ecuador. *Condor* 49(1): 25-31.
- Skutch, A.F. 1959. Red-throated Caracara - the scourge of the wasps. *Animal Kingdom* 62: 8-13.
- Skutch, A.F. 1960. The laughing reptile hunter of tropical America. *Animal Kingdom* 63: 115-119.
- Skutch, A.F. 1965. Life history notes on two tropical American kites. *Condor* 67(3): 235-246.
- Skutch, A.F. 1967. *Life Histories of Central American Highland Birds*.
- Skutch, A.F. 1971. *A Naturalist in Costa Rica*. University of Florida Press, Gainesville.
- Skutch, A.F. 1983a. *Birds of Tropical America*. University of Texas Press, Austin, Texas.
- Skutch, A.F. 1983b. *Herpetotheres cachinnans* (Guaco, Laughing Falcon). Pp. 582-583 in Janzen, ed. 1983.
- Sládek, J. 1959a. [Die Morpha 'fulviventris' des Schreiadlers (*Aquila pomarina*)] *Sylvia* 16: 279-281. In Slovak with German summary.
- Sládek, J. 1959b. [Die Arealerweiterung des Kaiseradlers (*Aquila heliaca*) in Mitteleuropa und sein Brutvorkommen in der Slowakei] *Sylvia* 16: 79-95. In Slovak with German summary.
- Sládek, J. 1993. [Beitrag zur Erforschung des Schreiadlers (*Aquila pomarina*) in der Slowakei]. *Vichodtoma* 6: 29-47. In Slovak with German summary.
- Slotow, R. & Perrin, M.R. 1992. The importance of large prey for Blackshouldered Kite reproduction. *Ostrich* 63: 180-182.
- Slotow, R., Mendelsohn, J.M. & Perrin, M.R. 1987. The diet of adult and nestling Blackshouldered Kites, and breeding success. *Ostrich* 59: 150-154.
- Slud, P. 1964. The Birds of Costa Rica: Distribution and Ecology. *Bulletin American Museum Natural History* 128.
- Small, B. 1995. Field identification of Red-footed Falcon. *British Birds* 88: 181-189.
- Smalley, M.F. 1983. A major Lesser Kestrel roost in Kenya. *Scopus* 7: 44-47.
- Smallwood, J.A. 1990. American Kestrel and Merlin. Pp. 29-37 in: *Proc. N. Raptor Manage. Sympos. and Workshop*. National Wildlife Federation Scientific Technical Series 14. National Wildlife Federation, Washington, D.C.
- Smart, A.C. 1991. Density and distribution of the African Fish Eagle *Haliaeetus rufifer* on Lakes Naivasha and Oludou, Kenya. *Scopus* 14: 76-83.
- Smeenk, C. 1974. Comparative ecological studies of some East African birds of prey. *Ardea* 62: 1-97.
- Smeenk, C. & Smeenk-Emserink, N. 1976. Observations on the Pale Chanting Goshawk *Motinus palustris* with comparative notes on the Gabar Goshawk *Motinus gabar*. *Ardea* 63: 93-115.
- Smeenk, C. & Smeenk-Emserink, N. 1977. Observations on the Shikra *Accipiter badius* in Nigeria. *Ardea* 65: 148-164.
- Smeenk, C. & Smeenk-Emserink, N. 1983. Observations on the Harrier Hawk *Polyborus typus* in Nigeria with comparative notes on the Neotropical Crane Hawk *Geranoospiza caerulescens*. *Ardea* 71: 133-144.
- Smith, D.G. & Murphy, J.R. 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. *Brigham Young Univ. Sci. Bull. (Biol. Ser.)* 18: 1-76.
- Smith, D.G. & Murphy, J.R. 1978. Biology of the Ferruginous Hawk in central Utah. *Sociobiology* 9: 79-98.
- Smith, D.G., Murphy, J.R. & Wolfenden, N.D. 1981. Relationships between jackrabbit abundance and Ferruginous Hawk reproduction. *Condor* 83: 52-56.
- Smith, D.G., Wilson, C.R. & Frost, H.H. 1972. The biology of the American Kestrel in central Utah. *Southwestern Naturalist* 17: 73-83.
- Smith, G. 1992. Gurney's Eagle *Aquila gurneyi* at Lae's city centre. *Muru* 5: 92.
- Smith, G.C. 1985. An analysis of prey remnants from Osprey *Pandion haliaetus* and White-bellied Sea-Eagle *Haliaeetus leucogaster* feeding roosts. *Emu* 85: 196-200.
- Smith, J.L.D. 1992. The Feeding Ecology of Brahminy Kites, *Haliastur indus* (Boddaert, 1785, from south-east Queensland. BSc thesis, University of Queensland, Brisbane.
- Smith, J.P., Hoffman, S.W. & Gevaman, J.A. 1990. Regional size differences among fall-migrant accipiters in North America. *J. Field Orn.* 61: 192-200.
- Smith, J.W. 1986. Characteristics of Mississippi Kite Nesting Habitat at Donaldson Point State Forest, Missouri. Special Report Missouri Dept. Cons., Jefferson City.
- Smith, K.D. 1965. On the birds of Morocco. *Ibis* 107: 493-526.
- Smith, L.E. 1991. Aerial display of the Red Goshawk *Erythrorhynchus radiatus*. *Austr. Bird Watcher* 14: 147-148.
- Smith, N.G. 1969. Provoked release of mobbing - a hunting technique of *Micrastur* falcons. *Ibis* 111: 241-243.
- Smith, N.G. 1970. Nesting of King Vulture and Black Hawk-eagle in Panama. *Condor* 722: 247-248.
- Smith, N.G. 1980. Hawk and vulture migrations in the Neotropics. Pp. 51-65 in: Keast & Morton eds. 1980.
- Smith, N.G. 1985. Dynamics of the transisthmian migration of raptors between Central and South America. Pp. 271-290 in: Newton & Chancellor 1985.
- Smith, N.G., Goldstein, D.L. & Bartholomew, G.A. 1986. Is long-distance migration possible for soaring hawks using only stored fat? *Auk* 106: 607-611.
- Smith, S.A. & Pasick, R.A. 1986. Olfactory sensitivity of the Turkey Vulture (*Cathartes aura*) to three carrion-associated deodorants. *Auk* 103: 586-592.
- Smith, S.M. 1982. Raptor 'reverse' dimorphism revisited: a new hypothesis. *Oikos* 39(1): 118-122.
- Smith, T.B. 1982. Nests and young of two rare raptors from Mexico. *Biotropica* 14(1): 79-80.
- Smith, T.B. & Temple, S.A. 1982a. Feeding habits and bill polymorphism in Hook-billed Kites. *Auk* 99(2): 197-207.
- Smith, T.B. & Temple, S.A. 1982b. Grenada Hook-billed Kites: recent status and life history notes. *Condor* 84(1): 131.
- Smythies, B.E. 1957. An annotated checklist of the birds of Borneo. *Sarawak Mus. J.* 7: 323-818.
- Smythies, B.E. 1981. *The Birds of Borneo*. 3rd edition. Sabah Society & Malayan Nature Society, Sabah & Kuala Lumpur.
- Smythies, B.E. 1986. *The Birds of Burma*. 3rd edition. Nimrod Press, Liss, Hants, UK.
- Snelling, J.C. 1970. Some information obtained from marking large raptors in the Kruger National Park, Republic of South Africa. *Ostrich* 8(Suppl.): 415-427.
- Snelling, J.C., Kemp, A.C. & Lincer, J.L. 1984. Organochlorine residues in southern African raptor eggs. Pp. 161-168 in: Mendelsohn & Sapsford, eds. 1984.
- Snow, C. 1973a. Bald Eagle. Habitat Management Series for Unique or Endangered Species. US Bureau of Land Management Tech. Note 171, report 5.
- Snow, C. 1973b. Golden Eagle. Habitat Management Series for Unique or Endangered Species. US Bureau of Land Management Tech. Note 171, report 7.
- Snow, D.W. ed. 1978. *An Atlas of Speciation in African Non-passerine Birds*. British Museum (Natural History), London.
- Snow, D.W. & Perrins, C.M. 1998. *Birds of the Western Palearctic: concise edition, Vol. 1 - Non-passerines*. Oxford University Press, Oxford.
- Snyder, D.E. 1966. *The Birds of Guyana*. Peabody Museum, Salem, Massachusetts.
- Snyder, N.F.R. 1975. Breeding biology of Swallow-tailed Kites in Florida. *Living Bird* 13: 73-97.
- Snyder, N.F.R. 1983. California Condor reproduction, past and present. *Bird Conserv.* 1: 67-86.
- Snyder, N.F.R. & Hamber, J.A. 1985. Replacement-clutching and annual nesting of California Condors. *Condor* 87: 374-378.
- Snyder, N.F.R. & Johnson, E.V. 1985. Photographic censusing of the 1982-1983 California Condor population. *Condor* 87: 1-15.

- the Brown Snake Eagle. *Ostrich* 43: 149-164.
- Steyn, P. 1972c. The Little Sparrowhawk at home. *Bokmakere* 24: 13-16.
- Steyn, P. 1973a. Observations on the Tawny Eagle. *Ostrich* 44: 1-22.
- Steyn, P. 1973b. Courtship flight of the Chanting Goshawk. *Ostrich* 44: 85.
- Steyn, P. 1975a. Observations on the African Hawk Eagle. *Ostrich* 46: 87-105.
- Steyn, P. 1975b. Supplementary notes on the nesting of the Brown Snake Eagle. *Ostrich* 46: 118.
- Steyn, P. 1978. Observations on the Long-crested Eagle. *Bokmakere* 30: 3-10.
- Steyn, P. 1980a. Breeding and food of the Bateleur *Terathopius caudatus* in Zimbabwe (Rhodesia). *Ostrich* 51: 168-178.
- Steyn, P. 1980b. Further observations on the Tawny Eagle *Aquila rapax*. *Ostrich* 51: 54-55.
- Steyn, P. 1980c. Notes on the prey and breeding success of the Martial Eagle *Polemnatus bellinotus*. *Ostrich* 51: 113-116.
- Steyn, P. 1980d. Observations on the prey and breeding success of Wahlberg's Eagle *Aquila wahlbergi*. *Ostrich* 51: 56-59.
- Steyn, P. 1980e. *Eagle Days*. Sable, Sanditon.
- Steyn, P. 1982. *Birds of Prey of Southern Africa, their Identification and Life Histories*. David Philip, Cape Town.
- Steyn, P. 1988. Observations on the Redbreasted Sparrowhawk. *P. wankarie* 40: 66-73.
- Steyn, P. 1992. Gabor Goshawks and colonial spiders. *Gabor* 7: 21.
- Steyn, P. & Barbour, D.Y. 1973. Observations at a Little Banded Goshawk's nest. *Ostrich* 44: 140-141.
- Steyn, P. & Grobler, J.H. 1981. Breeding biology of the Booted Eagle in South Africa. *Ostrich* 52: 108-118.
- Steyn, P. & Meyburg, N. 1989. Development halted for a Black Hawk. *Birding in SA* 41: 15.
- Steyn, P. & Meyburg, N. 1991. Notes made at two Secretarybird nests. *Birding in SA* 44: 19-21.
- Steyn, P. & Meyburg, N. 1992. Observations on the breeding of Pale Chanting Goshawks. *Birding in SA* 44: 80-83.
- Stiles, F.G. 1978. Possible specialization for hummingbird-hunting in the Tawny Hawk. *Auk* 95(3): 550-553.
- Stiles, F.G. & Janzen, D.H. 1983. *Buteo magnirostris* (Gavilan Chapulinero, Roadside Hawk). Pp. 351-352 in: Janzen, ed. 1983.
- Stiles, F.G. & Skutch, A.F. 1989. *A Guide to the Birds of Costa Rica*. Christopher Helm, London.
- Stirling, D. 1993. Sight record of a Merlin (*Falco columbarius*) on Kauai. *Elepaio* 53: 36.
- Sjoberg, T. 1981. *Projekt Havsvorn i Ermland och Sverige*. Jord-och Skogsbruksministeriet, Helsinki. In Swedish with English summary.
- Sjoberg, T. & Saurala, P. 1983. Population trends and management of the White-tailed Eagle in northwestern Europe. Pp. 307-318 in: Bird 1983.
- Stockton, A. 1978. *Aves de la República Dominicana*. Museo Nacional de Historia Natural, Santo Domingo.
- Studdart, D.R., ed. *Biogeography and ecology of the Seychelles Islands*. The Hague: Dr W Junk.
- Stokes, A. 1980. Notes on the landbirds of New Caledonia. *Emu* 80: 81-86.
- Stokes, T. 1988. A Review of the Birds of Christmas Island, Indian Ocean. Occasional Paper 16. Australian National Parks & Wildlife Service, Canberra.
- Stokes, T. 1996. Helicopter effects upon nesting White-bellied Sea-eagles and upon smaller birds at an isolated protected location. (Eabelby Island, Great Barrier Reef, Australia). *Condor* 20: 25-28.
- Storer, R.W. 1952. Variation in the resident Sharp-shinned Hawks of Mexico. *Condor* 54: 283-287.
- Storer, R.W. 1954. Weight, wing area, and skeletal proportions in three accipiters. Pp. 287-290 in: *Acta XI Int. Orn. Congr.*, Basel, 1954.
- Storer, R.W. 1955. Weight, wing areas and skeletal proportions in three accipiters. *Int. Orn. Congr.* 11: 287-290.
- Storer, R.W. 1956. Sexual dimorphism and food habits in three North American accipiters. *Auk* 83: 424-436.
- Storz, D.F., Fitzpatrick, J.W., Parker, T.A. & Moskowitz, D.K. 1996. *Neotropical birds: ecology and conservation*. University of Chicago Press, Chicago.
- Storz, N.G. & Goodrich, L.J. 1989. Sexual differences in timing of American Kestrel migration at Hawk Mountain Sanctuary, PA. *J. Raptor Res.* 23: 167-171.
- Straneck, R.J. & Vasina, G. 1982. Unusual behaviour of the Spot-winged Falconet (*Spizopteryx circumcinctus*). *J. Raptor Res.* 16(1): 25-26.
- Strange, J.J. 1990. The Striated Caracara *Phalacrocorax australis* in the Falkland Islands.
- Straube, F.C. & Bornschein, M.R. 1989. A contribuição de André Mayer, a história natural no Paraná (Brasil). I. Sobre uma coleção de aves do extremo noroeste do Paraná e sul do Mato Grosso do Sul. *Atq. Biol. Tecnol. (Curitiba)* 322: 441-471.
- Straube, F.C. & Bornschein, M.R. 1991. Sobre *Leucopternis polianota* (Kaup, 1847) nos estados do Paraná e Santa Catarina (sul do Brasil). Resúmenes. In: *I Encontro de Ornitologia de Paraguai, Brasil e Argentina*. Ciudad del Este, Paraguai.
- Strauch, J.G. 1975. Observations at a nest of the Black-and-white Hawk-eagle. *Condor* 77(4): 512.
- Strecker, J.K. 1930. Field notes on western Texas birds. *Contr. Baylor Univ. Mus.* 22: 1-14.
- Stresemann, E. 1927-31. Aves. In: Kükenthal, W. & Krumbach, T. (eds), *Handbuch der Zoologie* 17-2. De Gruyter, Berlin & Leipzig.
- Stresemann, E. 1932. Vorläufiges über die ornithologischen Ergebnisse der Expedition Heinrich 1930-1932. *Orn. Monatsber.* 40: 113-115.
- Stresemann, E. 1938. *Spizactes alboniger* (Blyth) und *Spizactes nannus* Wallace, zwei fälschlich vereinigte Arten. *J. Orn.* 86: 425-431.
- Stresemann, E. 1940a. Die Vogel von Celebes. *J. Orn.* 88: 467-487.
- Stresemann, E. 1940b. Zur Kenntnis der Wespenbusarde. *Arch. Naturgeschichte* 9: 137-193.
- Stresemann, E. 1944. Die Wanderungen des Schmutzgeiers (*Neophron p. pteropterus*). *Orn. Monatsber.* 52: 146-152.
- Stresemann, E. 1959. *Buteo allagula philippii*, ein in Südamerika weit verbreiteter Bussard. *J. Orn.* 100: 337-340.
- Stresemann, E. 1966. Die Mäuser der Vogel. *J. Orn.* 107: 1-48.
- Stresemann, E. & Amadon, D. 1979. *Order Falconiformes*. Pp. 271-425 in: Mayr & Cottrell, eds. 1979.
- Stresemann, V. 1959. The wing molt and systematic position of the genus *Gampsonyx*. *Auk* 76: 360-361.
- Stresemann, V. & Stresemann, E. 1960. [Restoration of *Asturina*]. *J. Orn.* 101: 373-403.
- Strigunov, V. 1984. [Isolated population of the Long-legged Buzzard in the Ukraine: possible ways of formation]. [All-Union Zoogeographical Conference, Moscow]. 8: 138-139. In Russian.
- Struhaker, T.T. & Leakey, M. 1990. Prey selectivity by Crowned Hawk Eagles on monkeys in the Kibale Forest, Uganda. *Behav. Ecol. Sociobiol.* 26: 435-444.
- Stuart, S.N. & Hutton, J.M. 1977. The avifauna of the east Usambara Mountains, Tanzania. Cambridge Ornithological Expedition to East Africa. Unpublished report.
- Suárez, F. 1973. Someros datos sobre crecimiento del Buitre Negro (*Aegyphus monachus*). *Ardeola* 19: 349.
- Suetsens, W. 1989. L'Aigle de Bonelli. Pp. 177-183 in: *Les Rapaces d'Europe*. Ed. du Perron.
- Suetsens, W. & van Groenendael, P. 1966. Sobre ecología y conducta reproductora del Buitre Negro (*Aegyphus monachus*). *Ardeola* 12: 19-44.
- Suetsens, W. & van Groenendael, P. 1967. La nidification du Vautour moine, *Aegyphus monachus*. *Gefaut* 57: 93-118.
- Suetsens, W. & van Groenendael, P. 1969. Notes sur l'écologie de l'Aigle de Bonelli *Hieraaetus fasciatus* et de l'Aigle botté *Hieraaetus pennatus* en Espagne méridionale. *Ardeola* 15: 19-30.
- Suetsens, W. & van Groenendael, P. 1971a. Note succincte sur la nidification d'un couple d'Aigle impérial (*Aquila heliaca adalberti*) dans la Provincia de Cáceres. *Ardeola Spec. Vol.* 575-580.
- Suetsens, W. & van Groenendael, P. 1971b. *Ardeola* 15: 19-29.
- Suetsens, W. & van Groenendael, P. 1972. Bijdrage tot de ecologie en de ethologie van de Lammiergeier, *Cypaetus barbatus nureus* (Habib). *Gefaut* 62: 203-214.
- Suetsens, W. & van Groenendael, P. 1977. Breeding of the Black-shouldered Kite *Elanus caeruleus* in Spain. *Gefaut* 67: 53-72.
- Sulkava, S. 1964a. On the behaviour and food habits of the Sparrowhawk (*Accipiter nisus*) during the nesting season.  *Suomen Riista* 17: 93-105.
- Sulkava, S. 1964b. Zur Nahrungsbiologie des Habichts, *Accipiter gentilis gentilis* (L.). *Apulo (Ser. Zool.)* 3: 1-103.
- Sulkava, S., Huhtala, K. & Rajala, P. 1984. Diet and breeding success of the Golden Eagle in Finland 1958-1982. *Ann. Zool. Fennici* 21: 283-286.
- Sulkava, S., Huhtala, K. & Tornberg, R. 1994. Regulation of Goshawk breeding in Western Finland over the last 30 years. In: Meyburg & Chancellor 1994a.
- Sumba, S.J.A. 1986. Breeding seasonality of the African Fish-eagle *Haliaeetus vocifer* in Queen Elizabeth Park, Uganda. *Afr. J. Ecol.* 24: 103-110.
- Sumba, S.J.A. 1988. Nestling growth in the African Fish-eagle in Uganda. *Afr. J. Ecol.* 26: 315-321.
- Sumba, S.J.A. 1989. Food procurement through piracy and scavenging in the African Fish-eagle in Queen Elizabeth National Park, Uganda. *Afr. J. Ecol.* 27: 111-118.

- Temple, S.A. 1987. Feeding ecology of the Mauritius Kestrel (*Falco punctatus*). *Biotropica* 19: 2-6.
- Temple, S.A. & Wallace, M.P. 1989. Survivorship patterns in a population of Andean Condors *Vultur gryphus*. Pp. 217-251 in: Meyburg & Chancellor 1989.
- Terborgh, J.W. 1983. *Five New World Primates: A Study in Comparative Ecology*. Monographs in Behavior and Ecology (eds. Krebs, J.R. & Clutton-Brock, T.). Princeton University Press, Princeton, New Jersey.
- Terborgh, J.W. & Weske, J.S. 1975. The role of competition in the distribution of Andean birds. *Ecology* 56: 562-576.
- Terrasse, J.F. 1977. Maturité sexuelle du Vautour fauve, premières données obtenues dans la nature. *Oiseau et RFO* 472: 214-218.
- Terrasse, J.F. 1985. The effects of artificial feeding on Griffon, Bearded and Egyptian Vultures in the Pyrenees. Pp. 429-430 in: Newton & Chancellor 1985.
- Terrasse, J.F. & Terrasse, M. 1977. The Osprey in the western Mediterranean: distribution, census, reproduction, threats. *Nos Oiseaux* 34: 111-127.
- Terrasse, J.F., Terrasse, M. & Budoant, Y. 1981. Observations sur la reproduction du Vautour fauve, du Percnoptère et du Gypaète barbu dans les Basses-Pyrénées. *Alauda* 28(4): 241-257, 29(1): 1-24.
- Terrasse, M. 1985. The status of vultures in France. In: Wilbur & Jackson 1985.
- Terrasse, M. & Dhautou, M. 1988. The vultures of Mali. *Vulture News* 20: 4-7.
- Terrasse, M., Bagnolini, C., Bonnet, J., Pinna, J.L. & Sarrazin, F. 1991. Reintroduction of the Griffon Vulture *Cape fulviventris* in the Massif Central, France. In: Meyburg & Chancellor 1991a.
- Tewes, F. 1991. The European Black Vulture *Aegypius monachus* Project in Mallorca. In: Meyburg & Chancellor 1991a.
- Tewes, M.E. 1984. Opportunistic feeding by White-tailed Hawks at prescribed burns. *Wilson Bull.* 96(1): 135-136.
- Thaler, F. & Pechlaner, H. 1980. Cannibalism in the Lammergeier or Bearded Vulture *Gypaetus barbatus aureus* at Innsbruck Alpenzoo. *Int. Zoo Yearbook*, 20: 278-280.
- Thaler, F., Maschler, S. & Steinkellner, V. 1986. Vergleichende Studien zur Postembryonalentwicklung dreier Altweltgeier: Bartgeier, Schmutzgeier und Gänsgeier. *Ann. Naturhist. Mus. Wien*, 88(89B): 361-376.
- Thevenot, M., Beaubrun, P. & Bergier, P. 1981. Status et évolution de la population de Faucon d'Éléonore *Falco eleonorae* au Maroc. *Ann. Centre Rech. Orn. Provence* 1: 111-115.
- Thibault, J.C. & Guyot, J. 1988. *Le Livre Rouge des Oiseaux Menacés des Régions Françaises d'Outre-Mer*. ICBP, Saint-Cloud, France.
- Thibault, J.C. & Patrimoine, O. 1991. Some aspects of the breeding success of the Osprey in Corsica, West Mediterranean. *Bird Study* 38: 98-102.
- Thibault, J.C., Vigne, J.D. & Torre, J. 1993. The diet of young Lammergeiers *Gypaetus barbatus* in Corsica: its dependence on extensive grazing. *Ibis* 135(1): 42-48.
- Thiollay, J.M. 1965. Notes sur le régime alimentaire du Faucon crécerelle *Falco tinnunculus* en hiver. *Nos Oiseaux* 21: 71-75.
- Thiollay, J.M. 1967a. Ecologie d'une population de rapaces diurnes en Lorraine. *Rev. Ecol. (Terre Vie)* 21: 116-183.
- Thiollay, J.M. 1967b. Essai sur les rapaces du Midi de la France, distribution-écologie, tentative de dénombrement. Aigle de Bonelli, *Hirraeetus fasciatus* (Viellot). *Alauda* 35: 140-150.
- Thiollay, J.M. 1968a. Notes sur les rapaces diurnes de Corse. *Oiseau et RFO* 38: 187-208.
- Thiollay, J.M. 1968b. Particularités du plumage chez les Gypaètes corses (*Gypaetus barbatus aureus*). *Alauda* 36: 211.
- Thiollay, J.M. 1970. Observations sur l'écologie d'une population de Busard des roseaux, *Circus aeruginosus*, en Camargue. *Nos Oiseaux* 30: 214-229.
- Thiollay, J.M. 1971. L'avifaune de la région de Lamto (moyenne Côte d'Ivoire). *Ann. Univ. Abidjan, sér. E. Ecol.* IV(1): 5-135.
- Thiollay, J.M. 1973a. Recherches écologiques dans la savane de Lamto (Côte d'Ivoire): le peuplement avien. Essai d'étude quantitative. *Rev. Ecol. (Terre Vie)* 1: 108-144.
- Thiollay, J.M. 1973b. Place des oiseaux dans les chaînes trophiques d'une zone préforestière en Côte d'Ivoire. *Alauda* 61: 273-300.
- Thiollay, J.M. 1973a. Les rapaces d'une zone de contact savane-forêt en Côte d'Ivoire. 1. Présentation du peuplement. *Alauda* 43: 75-102.
- Thiollay, J.M. 1973b. Les rapaces d'une zone de contact savane-forêt en Côte d'Ivoire 2. Densité, dynamique et structure du peuplement. *Alauda* 43: 307-416.
- Thiollay, J.M. 1973c. Les rapaces des parcs nationaux de Côte d'Ivoire. Analyse du peuplement. *Oiseau et RFO* 45: 241-257.
- Thiollay, J.M. 1973d. Migrations de rapaces africains en Ouganda et au Rwanda. *Oiseau et RFO* 45: 192-194.
- Thiollay, J.M. 1976a. Besoins alimentaires quantitatifs de quelques oiseaux tropicaux. *Rev. Ecol. (Terre Vie)* 30: 229-245.
- Thiollay, J.M. 1976b. Les rapaces d'une zone de contact savane-forêt en Côte d'Ivoire. 3. Modalités et succès de la reproduction. *Alauda* 44(3): 275-300.
- Thiollay, J.M. 1976c. Notes sur les oiseaux du Nord du Yémen. *Oiseau RFO* 46: 264-265.
- Thiollay, J.M. 1977a. Distribution saisonnière des rapaces diurnes en Afrique occidentale. *Oiseau et RFO* 47: 25-85.
- Thiollay, J.M. 1977b. Le peuplement de Falconiformes d'une savane ougandaise: structure et fluctuations à court terme. *Oiseau et RFO* 47: 253-294.
- Thiollay, J.M. 1977c. Les rapaces d'une zone de contact savane-forêt en Côte d'Ivoire 4. Modes d'exploitation du milieu. *Alauda* 45: 197-218.
- Thiollay, J.M. 1977d. La migration d'automne sur la côte orientale du Mexique. *Alauda* 45: 344-346.
- Thiollay, J.M. 1978a. Les rapaces d'une zone de contact savane-forêt en Côte d'Ivoire. 5. Spécialisations alimentaires. *Alauda* 46: 147-170.
- Thiollay, J.M. 1978b. Population structure and seasonal fluctuations of the Falconiformes in Uganda National Parks. *East Afr. Wildl. J.* 16: 145-152.
- Thiollay, J.M. 1978c. Les migrations de rapaces en Afrique Occidentale: adaptations écologiques and fluctuations saisonnières de production des écosystèmes. *Rev. Ecol. (Terre Vie)* 32: 89-133.
- Thiollay, J.M. 1978d. Distribution des Falconiformes nicheurs autour du massif de l'Annapurna (Himalaya Central). *Oiseau et RFO* 48: 291-310.
- Thiollay, J.M. 1980a. Spring hawk migration in eastern Mexico. *J. Raptor Res.* 14: 13-20.
- Thiollay, J.M. 1980b. Stratégies d'exploitation par les rapaces d'un écosystème herbacé néotropical. *Alauda* 48(4): 221-254.
- Thiollay, J.M. 1981. Feeding ecology and activity budget of a population of African Fish-eagles *Haliaeetus vocifer*. *Rev. Ecol. (Terre Vie)* 35: 537-562.
- Thiollay, J.M. 1984. Raptor community structure of a primary rain forest in French Guiana and effect of human hunting pressure. *J. Raptor Res.* 18: 117-122.
- Thiollay, J.M. 1985a. Birds of prey in French Guiana - a preliminary survey. *Bull. World Working Group on Birds of Prey* 2: 1-15.
- Thiollay, J.M. 1985b. Composition of falconiform communities along successional gradients from primary forest to secondary habitats. Pp. 181-190 in: Newton & Chancellor 1985.
- Thiollay, J.M. 1985c. Species diversity and comparative ecology of rainforest Falconiformes on three continents. Pp. 167-179 in: Newton & Chancellor 1985.
- Thiollay, J.M. 1985d. The birds of Ivory Coast: status and distribution. *Alauda* 7(1): 1-59.
- Thiollay, J.M. 1989a. Area requirements for the conservation of rain forest raptors and game birds in French Guiana. *Conserv. Biol.* 3: 128-137.
- Thiollay, J.M. 1989b. Censusing of diurnal raptors in a primary rain forest: comparative methods and species detectability. *J. Raptor Res.* 23(3): 72-81.
- Thiollay, J.M. 1989c. Distribution and ecology of Palearctic birds of prey wintering in West and Central Africa. Pp. 95-108 in: Meyburg & Chancellor 1989.
- Thiollay, J.M. 1991a. Altitudinal distribution and conservation of raptors in southwestern Colombia. *J. Raptor Res.* 25(1): 1-8.
- Thiollay, J.M. 1991b. Foraging, home range use, and social behavior of a group-living rainforest raptor, the Red-throated Caracara, *Daptrius americanus*. *Ibis* 133(4): 302-303.
- Thiollay, J.M. 1993a. Habitat segregation and the insular syndrome: two congeneric raptors in New Caledonia: the White-bellied Goshawk *Accipiter haplochrous* and the Brown Goshawk *A. fasciatus*. *Ibis* 135(5): 237-246.
- Thiollay, J.M. 1993b. Survey of the threatened subspecies of Hook-billed Kite in Grenada. *World Working Group on Birds of Prey News* 18: 10.
- Thiollay, J.M. 1996. Oiseaux de la Réunion: vers une nécessaire union des efforts de tous les ornithologues? *Cour. Nat.* 158: 4.
- Thiollay, J.M. & Clabert, J. 1990. Comparative foraging adaptations of small raptors in a dense African savanna. *Ibis* 132: 42-57.
- Thiollay, J.M. & Meyburg, B.-U. 1981. Remarques sur l'organisation d'un peuplement insulaire de rapaces: Madagascar. *Alauda* 49: 216-226.
- Thiollay, J.M. & Meyburg, B.-U. 1986. For-

- est fragmentation and the conservation of raptors, a survey on the island of Java. *Biol. Conserv.* 44: 229-250.
- Thiollay, J.M. & Meyer, J.A. 1978. Denutée-taille des territoires et production dans une population d'Aigles pêcheurs, *Haliaeetus vocifer* (Daudin). *Rev. Ecol. (Terre Vie)* 32: 203-220.
- Thomas, B.T. 1979. The birds of a ranch in the Venezuelan llanos. Pp. 213-232 in: Eisenberg, ed. 1979.
- Thomas, F.S. 1928. Nesting of the Black Vulture in Hocking County, Ohio. *Ohio State Mus. Sci. Bull.* 1: 29-35.
- Thompson, P.S., Thompson, M.L.P. & Thompson, D.B.A. 1989. Cliff nesting Merlin in north-west Sutherland. *Scottish Birds* 15: 183-184.
- Thomsen, P. & Jacobsen, P. 1979. *The Birds of Deniss*. Nature-Travels, Copenhagen.
- Thomsett, S. 1988. Can Crowned Eagles be sexed by plumage alone? *Gabari* 3: 70-72.
- Thomsett, S. 1991a. Notes on the status and behaviour of Black Sparrowhawks in Kenya. *Gabari* 6: 27-29.
- Thomsett, S. 1991b. Polyandrous Pygmy Falcon? *Gabari* 6: 75.
- Thomson, A.L. & Moreau, R.F. 1957. Feeding habits of the Palm-nut Vulture *Cypohanus*. *Ibis* 99: 608-613.
- Thomson, W.R. 1975. Notes on the Bat-hawk in Rhodesia. *Ibhamakere* 27: 52-55.
- Thomson, W.R. 1980. DDI in Zimbabwe. Pp. 169-172 in: Mendelsohn & Sapsford, eds. 1980.
- Thorstrom, R.K. 1989. Breeding biology, behavior, and home range of the Banded Forest-falcon (*Micrastur ruficollis*). Pp. 81-91 in: Burnham *et al.* 1989.
- Thorstrom, R.K. 1990a. Breeding biology of the Banded Forest-falcon (*Micrastur ruficollis*). Pp. 145-148 in: Burnham *et al.* 1990.
- Thorstrom, R.K. 1990b. Breeding biology of the Collared Forest-falcon (*Micrastur semitorquatus*). Pp. 149-157 in: Burnham *et al.* 1990.
- Thorstrom, R.K. & Morales, C.M. 1993. Breeding biology, food habits, and home range of the Banded Forest-falcon (*Micrastur gilvicolis*) in Guatemala. *J. Raptor Res.* 27(1): 83.
- Thorstrom, R.K., Castillo, J.M. & Castillo, A. 1991. Breeding biology of the Bicolored Hawk (*Accipiter bicolor*). Pp. 73-75 in: Whitacre *et al.* 1991.
- Thorstrom, R.K., Morales, C.M. & Mateo, C.S. 1992. Breeding biology, home range, and population dynamics of the Banded Forest-falcon in Tikal National Park. Pp. 201-208 in: Whitacre & Thorstrom 1992.
- Thorstrom, R.K., Quischan, A.M. & Morales, C.M. 1991a. Breeding biology of the Banded Forest-falcon (*Micrastur ruficollis*). Pp. 121-126 in: Whitacre *et al.* 1991.
- Thorstrom, R.K., Ramos, J. & Castillo, J.M. 1991b. Breeding biology of the Collared Forest-falcon (*Micrastur semitorquatus*). Pp. 127-131 in: Whitacre *et al.* 1991.
- Thorstrom, R.K., Turley, C.W., Ramirez, E.G. & Gilroy, B.A. 1990. Descriptions of nest, eggs and young of the Banded Forest-falcon (*Micrastur ruficollis*) and of the Collared Forest-falcon (*Micrastur semitorquatus*). *Condor* 90(2): 237-239.
- Thouless, C.R., Fanshawe, J.H. & Bertram, B.C.R. 1989. Egyptian Vultures *Nophon percnopterus* and Ostrich *Struthio camelus* eggs: the origins of stone-throwing behaviour. *Ibis* 131(1): 9-15.
- Thurber, W.A. & Serrano, J.R. 1972. Status of the White-tailed Kite in El Salvador. *Condor* 74(4): 489-491.
- Thurber, W.A., Serrano, J.F., Sermeño, A. & Benitez, M. 1987. Status of uncommon and previously unreported birds of El Salvador. *Proc. West. Found. Vert. Zool.* 3: 109-243.
- Thurrow, T.L. & Black, H.I. 1981. Ecology and behaviour of the Gymnogene *Polyboroides typus*. *Ostrich* 52: 25-35.
- Thurrow, T.L. & White, C.M. 1983. Nest site relationship between Ferruginous Hawk and Swainson's Hawk. *J. Field Orn.* 54: 401-406.
- Tikader, B.K. 1988. *Birds of Andaman & Nicobar Islands*. Zool. Surv. India, Calcutta.
- Tiley, G. 1985. Notes on nesting Spotted Harriers *Circus assimilis*. *Aust. Bird Watcher* 11: 97.
- Tinbergen, L. 1936a. Gegevens over het voedsel van nederlandse haviken (*Accipiter gentilis gallinarum* (Brehm)). *Arden* 25: 195-200.
- Tinbergen, L. 1948. Spervier als Roofvijand van Zangvogels. *Ardea* 34: 1-125.
- Tinbergen, L. 1949. Beobachtungen über die Arbeitsteilung des Turmfalken (*Falco tinnunculus*) während der Fortpflanzungszeit. *Arden* 29: 63-98.
- Tishechkin, A.K. & Ivanovsky, V.V. 1992. Status and breeding performance of the Osprey in northern Byelorussia. *Ornis Fenn.* 69: 149-154.
- Tius, K. & Fuller, M.R. 1990. Recent trends in counts of migrant hawks from northeastern North America. *J. Wildl. Manage.* 54: 463-470.
- Titus, K. & Mosher, J.A. 1981. Nest-site habitat selection in woodland hawks in the central Appalachians. *Auk* 98: 270-281.
- Tjernberg, M. 1981. Diet of the Golden Eagle *Aquila chrysaetos* during the breeding season in Sweden. *Holarctic Ecol.* 4: 12-19.
- Tjernberg, M. 1983a. Prey abundance and reproductive success of the golden eagle *Aquila chrysaetos* in Sweden. *Holarctic Ecol.* 6: 17-23.
- Tjernberg, M. 1983b. *Breeding Ecology of the Golden Eagle, Aquila chrysaetos, in Sweden*. Swedish University of Agricultural Sciences, Department of Wildlife Ecology.
- Tjernberg, M. 1985. Spacing of Golden Eagle *Aquila chrysaetos* nests in relation to nest site and food availability. *Ibis* 127: 250-255.
- Tjernberg, M. 1988. Åldersbestämning av kungsförn *Aquila chrysaetos*. *Vår Fågelsvärld* 47: 321-339.
- Tjernberg, M. 1990. Kungsförnen *Aquila chrysaetos* i Sverige - utbredning, status och hot. *Vår Fågelsvärld* 49: 337-348.
- Tjernberg, M. & Rytman, H. 1994. Bivråkens *Pernis ptilorhynchus* överlevnad och beståndsutveckling i Sverige. *Ornis Svecica* 4: 135-139.
- Tolard, W.E.C. & Carriger, M.A. 1922. The birds of the Santa Marta region of Colombia: a study in altitudinal distribution. *Ann. Carnegie Mus.* 14.
- Toland, B. 1984. Unusual predatory and caching behavior of the American Kestrel in central Missouri. *J. Raptor Res.* 18: 107-110.
- Toland, B. 1985a. Food habits and hunting success of Cooper's Hawk in Missouri. *J. Field Orn.* 56: 419-422.
- Toland, B. 1985b. Double brooding by American Kestrels in central Missouri. *Condor* 87: 434-436.
- Tollan, A.M. 1988. Maintenance energy requirements and energy assimilation efficiency of the Australasian Harrier. *Ardea* 76: 181-186.
- Tomback, D.F. & Murphy, J.R. 1981. Food deprivation and temperature regulation in nesting Ferruginous Hawks. *Wilson Bull.* 93: 92-97.
- Tommeraaas, P.J. 1978. Kunstige reirplasser for jaktfalk *Falco rusticolus* og vandrefalk *Falco peregrinus*. *Vår Fuglefauna* 1: 124-151.
- Tommeraaas, P.J. 1989. A time-lapse nest study of a pair of Gyrfalcons *Falco rusticolus* from their arrival at the nesting ledge to the completion of egg-laying. *Fauna Norvegica (Ser. C, Cinclus)* 12: 32-63.
- Toume, W. & Risset, A.C. 1988. Captive management of the California Condor *Gymnogyps californianus*. *Int. Zoo Yearbook* 27: 30-38.
- Tornberg, R., Monkkonen, M. & Pahlkala, M. 1989. Changes in diet and morphology of Finnish goshawks from 1960s to 1990s. *Oecologia* 1989: 369-376.
- Torres Leyva, A., Wotzkow Alvarez, C. & Rams Beceña, A. 1988. Algunas consideraciones sobre la biología del Gavilán Colilargo Oriental *Accipiter gundlachi wileyi* (Wotzkow) en las provincias orientales. *Garrano* 10: 1-2.
- Tostain, O. 1986a. Adaption du mode de chasse chez le Faucon des chauves-souris (*Falco rufigularis*) en Guyane. *Alauda* 54(1): 66-67.
- Tostain, O. 1986b. Etude d'une succession terrestre en milieu tropical: les relations entre la physiologie végétale et la structure du peuplement avien en mangrove guyanaise. *Rev. Ecol. (Terre Vie)* 41(4): 315-342.
- Tostain, O., Dujardin, J.L., Erard, C. & Thiollay, J.M. 1992. *Oiseaux de Guyane*. Société d'Etudes Ornithologiques, Paris.
- Towers, S.R. 1980. Cuckoldry in an American Kestrel triad. *Condor* 92: 257-258.
- Toyne, J.P. 1998. Breeding season diet of the Goshawk *Accipiter gentilis* in Wales. *Ibis* 140(4): 569-579.
- Traylor, M.A. 1948. New birds from Peru and Ecuador. *Fieldiana, Zool.* 31: 195-200.
- Traylor, M.A. 1958. *Birds of Northeastern Peru*. Chicago Natural History Museum.
- Traylor, M.A. 1960. Notes on the birds of Angola, non-passeres. *Publ. Coll. Comp. Thom. Angola, Lisbon* 51: 129-186.
- Tree, A.J. 1973. Honey Buzzard *Pernis ptilorhynchus*. *Ostrich* 44: 127.
- Tree, A.J. 1978. Whither the Bateleur? *Honeyguide* 95: 37-38.
- Trenv, V.D. & Strelchenko, V.I. 1970. [Breeding of the Steppe Eagle (*Aquila caspius nipalensis*) at the Askania-Nova Reserve, Russia]. *Natur (Nauka)* 12. In Russian.
- Tribarren, J.J. 1975. Biología del *Aguila calzada* (*Hieraaetus pennatus*) durante el periodo de nidificación en Navarra. *Ardeola* 21: 305-320.
- Tubbs, C.R. 1974. The Buzzard. David & Charles, Newton Abbott, UK.
- Tucker, G.M. & Heath, M.F. (eds). 1994. *Birds in Europe: their conservation status*. BirdLife Conservation Series No. 3. BirdLife International, Cambridge, UK.
- Tucker, V.A. & Heine, C. 1990. Aerodynamic

- ecology of the Marsh Harrier *Circus aeruginosus* in the Barycz valley, Poland. *Acta Orn. Warszawa* 25: 223-229.
- Woffinden, N.D. 1975. Ecology of the Ferruginous Hawk (*Buteo regalis*) in Central Utah. Population Dynamics and Nest Site Selection. PhD thesis, Brigham Young University, Provo, Utah.
- Woffinden, N.D. 1986. Notes on the Swainson's Hawk in central Utah: insectivory, premigratory aggregations, and kleptoparasitism. *Great Basin Nat.* 46: 302-304.
- Woffinden, N.D. & Murphy, J.R. 1977. Population dynamics of the Ferruginous Hawk during a prey decline. *Great Basin Nat.* 37: 411-425.
- Woffinden, N.D. & Murphy, J.R. 1983. Ferruginous Hawk nest site selection. *J. Wildl. Manage.* 47: 216-219.
- Woffinden, N.D. & Murphy, J.R. 1989. Decline of a Ferruginous Hawk population - a 20-year summary. *J. Wildl. Manage.* 53: 1127-1132.
- Wolf, D.E. 1984. Ayres' Hawk Eagle *Hieranetus dubius* feeding on a fruit bat. *Scopus* 8: 44.
- Wolfe, I.R. 1938. Birds of central Luzon. *Auk* 55: 202.
- Wolfe, I.R. 1951. Eggs of the Falconiformes. Part 3. *Oologist's Record* 25: 49-54.
- Wolfe, I.R. 1954. Nesting of the Laughing Falcon. *Condor* 56(3): 161-162.
- Wood, B. 1987. Hunting technique of the African Goshawk *Accipiter taylori* and its possible relationship with other Accipiter species. *Scopus* 11: 6-8.
- Wood, D. 1969. 1982. In *Guinness Book of Animal Facts & Feats*.
- Wood, D. 1972. In *Australian Raptor Association News*.
- Wood, P.B., Nesbitt, S.A. & Steffer, A. 1993. Bald Eagles prey on Sandhill Cranes in Florida. *J. Raptor Res.* 27: 164-165.
- Wood, Y.J. 1970. The breeding distribution of *Elanus caeruleus* in New Guinea. *Austral J.* 48-55.
- Woodall, P.F. 1971. Bird notes from northern Sengwa Gorge, Rhodesia. *Ostrich* 42: 148-149.
- Woodin, N. 1980. Observations on Gyrfalcons (*Falco rusticolus*) breeding near Lake Myvatn, Iceland, 1967. *J. Raptor Res.* 14: 97-124.
- Woods, R.W. 1988. *Guide to Birds of the Falkland Islands*. Anthony Nelson, Oswestry, UK.
- Wootton, J.T. & Bell, D.A. 1992. A metapopulation model of the Peregrine Falcon in California: viability and management strategies. *Ecol. Applications* 2: 307-321.
- Wooden, C. 1985. Possible breeding of the Red-necked Falcon in Zimbabwe. *Honeyguide* 31: 217.
- Wotzkow, C. 1986a. Status and distribution of Falconiformes in Cuba. Pp. 1-10 in: Chancellor & Meyburg 1986.
- Wotzkow, C. 1986b. Ecological observations of Gundlach's Hawk *Accipiter gundlachi* in Cuba. Pp. 111-114 in: Chancellor & Meyburg 1986.
- Wotzkow, C. 1991. New subspecies of Gundlach's Hawk, *Accipiter gundlachi*. Pp. 271-281 in: Chancellor & Meyburg 1991.
- Wrege, P. & Cade, I.J. 1977. Courtship behaviour of the large falcons in captivity. *J. Raptor Res.* 11: 1-27.
- Wunderlich, K. 1980. Zum Nahrungsspektrum freilebender Riesenseeadler, *Haliaeetus pelagicus* (Pallas), im Fernen Osten. *Mitu* 5: 130-132.
- Wyllie, I. 1985. Post-fledging period and dispersal of young Sparrowhawks. *Bird Study*.
- Wyllie, I. & Newton, I. 1991. Demography of an increasing population of Sparrowhawks. *J. Anim. Ecol.* 60: 749-766.
- Wyrwoll, T. 1977. Die Jagdbereitschaft des Habichts (*Accipiter gentilis*) in Beziehung zum Horstort. *J. Orn.* 118: 21-34.
- Yalden, D.W. & Warburton, A.B. 1979. The diet of the Kestrel in the Lake District. *Bird Study* 26: 165-170.
- Yáñez, J.L., Núñez, H., Schläpfer, R.P. & Jaksic, F.M. 1980. Diet and weight of American Kestrels in central Chile. *Auk* 97: 629-631.
- Yáñez, J.L., Núñez, H. & Jaksic, F.M. 1982. Food habits and weight of Chimango Caracaras in central Chile. *Auk* 99(1): 170-171.
- Ydenberg, R.C. & Forbes, L.S. 1991. The survival-reproduction selection equilibrium and reversed size dimorphism in raptors. *Oikos* 60: 115-120.
- Ye Xiao-Ti. 1991. Distribution and status of the Cinereous Vulture *Accipiter monachus* in China. Pp. 51-56 in: Chancellor & Meyburg 1991.
- Yekutieli, D. 1991. *Raptors in Israel. Passage and Wintering Populations*. International Birdwatching Center Eilat, Eilat, Israel.
- Yocom, C.F. 1944. Evidence of polygamy among Marsh Hawks. *Wilson Bull.* 56: 117-117.
- Yon-Tou, Y. & Ai, A. 1982. Criticism of von Schantz and Nilsson's hypothesis on the reasons for the reversed size dimorphism in birds of prey. *Oikos* 38(3): 1982: 307.
- Yovel, R. 1991. Foraging habits, hunting and breeding success of Lesser Falcons (*Falco biarmicus*) in Israel. *J. Raptor Res.* 25: 77-81.
- Yovel, R. & Fornasari, L. 2000. Biometric differences between age and sex classes of the Levant sparrowhawk *Accipiter brevipes* on migration at Eilat, Israel. *Israel Journal of Zoology* 46(3): 207-214.
- Young, C.G. 1925. Notes on the nests and eggs of some British Guiana birds. *Biol. Sci.* 12: 465-475.
- Young, H. 1973. Breeding of a pair of Wedge-tailed Eagles. *Aust. Bird Watcher* 5: 99-101.
- Young, J.G. 1973. Social nesting and polygamy in Kestrels and Sparrowhawks. *British Birds* 66: 32-33.
- Yreberg, N.J. 1992. [White-tailed Eagle *Haliaeetus albicilla* hunting in a Grey Heron *Ardea cinerea* colony in Sunnmøre, Norway]. *Fauna Norvegica (Ser. C, Cinclus)* 15(1): 25-30. In Norwegian with English summary.
- Zabarn, A.F. 1968. [On nutrition of the Imperial Eagle in Kustanay region]. *Orenitologiya* 9: 347-348. In Russian.
- Zalles, J.I. & Bildstein, K.L. (eds) 2000. *Raptor Watch - A global directory of raptor migration sites*. BirdLife Conservation Series No. 9. BirdLife International, Cambridge, UK, & Hawk Mountain Sanctuary, Kempton, PA, USA.
- Zarn, M. 1979. Osprey *Pandion haliaetus canadensis*, US Department of the Interior.
- Zastrow, M. 1946. On the distribution and biology of the Golden Eagle in Estonia. *Vdr Fågelvärld* 5: 64-80.
- Zhang Xiao-ai. 1984. Measurements of growth, development and daily energy of Upland Buzzard *Buteo hemilasius* nestlings. *Zool. Res.* 5(4): 369-376.
- Zimmerman, D.A. 1965. The Gray Hawk in the southwest. *Audubon Field Notes* 19: 475-477.
- Zimmerman, D.A. 1976a. Comments on feeding habits and vulture-mimicry in the Zone-tailed Hawk. *Condor* 78(3): 420-421.
- Zimmerman, D.A. 1976b. On the status of *Buteo nitidus* in New Mexico. *Auk* 93(3): 650-655.
- Zimmerman, D.A., Turner, D.A., & Pearson, D.J. 1996. *Birds of Kenya and Northern Tanzania*. Christopher Helm, London.
- Zollinger, R. & Hagemeyer, W.J.M. 1994. The Lesser Kestrel *Falco naumanni* - review of the status of a globally threatened species. In: Meyburg & Chancellor 1994a.
- Zontrillo, B. 1977. Re-discovery of the Andean Condor *Vultur gryphus* in Venezuela. *Bull. Brit. Orn. Club* 97: 17-18.
- Zotta, A. 1931. Notas sobre dos rapaces migratorias (*Buteo swainsoni* y *Tachytrichus albicaudatus*). *Hornero* 4: 421-424.
- Zukowsky, I. 1966. Meine Begegnungen mit dem Schwarzen Seeadler, *Haliaeetus pelagicus niger* Heude, von Korea. *Zool. Garten NF* 32: 54-59.
- Zwart, P. & Louwman, J.W.W. 1980. Feeding a hand-reared Andean Condor and King Vulture, *Vultur gryphus* and *Sarcotamphus papa*, at Wassenaar Zoo. *Int. Zoo Yearbook* 20: 276-277.

# INDEX

Species are listed by their vernacular name (e.g. Black Vulture) and by their scientific name. Specific scientific names are followed by their generic name as used in the book (e.g. *atratus*, *Coragyps*) and subspecific names are followed by both the specific and generic names (e.g. *foetens*, *Coragyps atratus*). Numbers in *italic* refer to the first page of the relevant systematic entry. Numbers in **bold type** refer to the colour plate numbers.

- abbotti*, *Spilornis* **130**, **463**  
*abdulali*, *Accipiter virgatus* **567**  
*abyssinicus*, *Falco biarmicus* **292**, **902**  
 Accipitridae **321**  
 Accipitriformes **317**  
*adalberti*, *Aquila heliaca* **236**, **740**  
 Adalbert's Eagle. *See* Imperial Eagle  
*egyptius*, *Milvus migrans* **22**, **385**  
*aequatorialis*, *Falco sparverius* **842**  
 Aequinoctial Hawk. *See* Rufous Crab-hawk  
*aequinoctialis*, *Buteogallus* **192**, **628**  
*aeruginosus*, *Circus* **142**, **498**  
*aeruginosus*, *Circus aeruginosus* **502**  
*alexandri*, *Falco columbarius* **290**, **880**  
*affinis*, *Accipiter virgatus* **158**, **567**  
*affinis*, *Milvus migrans* **385**  
 African Baza. *See* African Cuckoo-hawk  
 African Black Eagle. *See* Verreaux's Eagle  
 African Black Vulture. *See* Lappet-faced Vulture  
 African Buzzard. *See* Mountain Buzzard  
 African Crowned Eagle. *See* Crowned Hawk Eagle  
 African Cuckoo-falcon. *See* African Cuckoo-hawk  
 African Cuckoo-hawk **8** **94**, **121**  
 African Eagle. *See* African Hawk Eagle  
 African Fish-eagle **16** **110**, **394**  
 African Goshawk **37** **152**, **515**, **521**  
 African Gymnogene **28** **134**, **474**  
 African Harrier-hawk. *See* African Gymnogene  
 African Hawk Eagle **83** **244**, **751**  
 African Hobby **101** **280**, **885**  
 African Little Sparrowhawk. *See* Little Sparrowhawk  
 African Long-tailed Hawk. *See* Long-tailed Hawk  
 African Marsh Harrier **50** **138**, **436**  
 African Pygmy-falcon **91** **260**, **823**  
 African Red-tailed Buzzard. *See* Red-necked Buzzard  
 African Swallow-tailed Kite. *See* Scissor-tailed Kite  
 African Whitebacked Griffon/Vulture. *See* White-backed Vulture  
*africanus*, *Ceryx* **122**, **425**  
*africanus*, *Spizartus* **246**, **770**  
*alascensis*, *Buteo jamaicensis* **685**  
*albicaudatus*, *Buteo* **206**, **668**  
*albicaudatus*, *Buteo albicaudatus* **670**  
*albicollis*, *Haliaeetus* **112**, **402**  
*albicollis*, *Leucopternis* **190**, **624**  
*albicollis*, *Leucopternis albicollis* **625**  
*albidus*, *Accipiter gentilis* **156**, **599**  
*albigula*, *Buteo* **204**, **662**  
*albiventris*, *Accipiter hughesii* **172**, **544**  
*albugularis*, *Accipiter* **170**, **542**  
*albugularis*, *Accipiter albugularis* **549**  
*albugularis*, *Phalacrocorax* **250**, **801**  
*albioniger*, *Spizartus* **228**, **781**  
*albonotatus*, *Buteo* **206**, **675**  
*alevius*, *Macheiramphus* **94**, **350**  
*alevius*, *Macheiramphus alevius* **352**  
 Aldabra Kestrel. *See* Malagasy Spotted Kestrel  
*aldabranus*, *Falco newtoni* **270**, **849**  
 Alexander's Kestrel. *See* Common Kestrel  
*alexandri*, *Falco tinnunculus* **847**  
*albus*, *Buteo magnirostris* **650**  
*alleni*, *Buteo lineatus* **656**  
 Allied Harrier. *See* Spotted Harrier  
*alopez*, *Falco* **266**, **857**  
 Altai Falcon **108** **294**, **906**  
*alticus*, *Falco* **294**, **906**  
 American Black Vulture. *See* Black Vulture  
 American Black-shouldered Kite. *See* White-tailed Kite  
 American Collared Hawk. *See* Semicollared Hawk  
 American Eagle. *See* Bald Eagle  
 American Harpy Eagle. *See* Harpy Eagle  
 American Harrier. *See* Northern Harrier  
 American Kestrel **98** **274**, **838**  
 American Swallow-tailed Kite. *See* Swallow-tailed Kite  
*americanus*, *Daptrius* **254**, **797**  
 Amur Falcon. *See* Eastern Red-footed Falcon  
*amurensis*, *Falco* **276**, **867**  
*anatium*, *Falco peregrinus* **300**, **302**, **917**  
 Andaman Dark Serpent-eagle. *See* Andaman Serpent-eagle  
 Andaman Serpent-eagle **27** **182**, **460**  
*andamanensis*, *Spizartus cirrhatus* **230**, **774**  
*andamanica*, *Aviceda leucophotes* **129**  
 Andean Condor **5** **88**, **113**  
*andersoni*, *Macheiramphus alevius* **94**, **352**  
*angolensis*, *Cypohetus* **110**, **411**  
*anthracinus*, *Buteogallus* **192**, **631**  
*anthracinus*, *Buteogallus anthracinus* **632**  
*antillarum*, *Buteo platypterus* **208**, **659**  
*apache*, *Accipiter gentilis* **599**  
*apivorus*, *Pernis* **90**, **336**  
 Aplomado Falcon **105** **298**, **875**  
*approximans*, *Circus* **144**, **503**  
*approximans*, *Circus approximans* **505**  
*aquilonis*, *Chondrohierax uncinatus* **102**, **334**  
*araea*, *Falco* **270**, **851**  
*arheri*, *Buteo augur* **220**, **715**  
*arheri*, *Falco tinnunculus* **847**  
 Archer's Buzzard. *See* Augur Buzzard  
*arlonaeus*, *Falco* **268**, **858**  
*arrogans*, *Accipiter gentilis* **599**  
*arthur*, *Falco ruficollis* **857**  
 Asian Black Eagle. *See* Indian Black Eagle  
 Asian Sparrowhawk. *See* Northern Sparrowhawk  
 Asiatic Honey-buzzard. *See* Eastern Honey-buzzard  
 Asiatic Sparrowhawk. *See* Japanese Sparrowhawk  
*asimilis*, *Circus* **144**, **472**  
*astur*, *Eutrochus* **134**, **472**  
*asturensis*, *Spilornis* **130**, **463**  
*ater*, *Daptrius* **254**, **796**  
*atritus*, *Coragyps* **96**, **305**  
*atritus*, *Coragyps atritus* **306**  
*atracapillus*, *Accipiter gentilis* **156**, **599**  
*audax*, *Aquila* **234**, **746**  
*audax*, *Aquila audax* **748**  
*auduboni*, *Cathartes planus* **252**, **806**  
*augur*, *Buteo* **220**, **717**  
*augur*, *Buteo augur* **715**  
 Augur Buzzard **21** **220**, **646**, **713**  
*auguralis*, *Buteo* **218**, **710**  
*auri*, *Cathartes* **86**, **306**

- aura*, *Cathartes aura* 308  
*auerus*, *Cypaetus barbatus* 116  
 Austral Caracara. *See* Forster's Caracara  
 Australasian Goshawk. *See* Brown Goshawk  
 Australasian Marsh Harrier **33** 144, 503  
 Australian Black-shouldered Kite **11** 100, 359  
 Australian Goshawk. *See* Brown Goshawk  
 Australian Hobby **102** 282, 898  
 Australian Kestrel **97** 272, 834  
 Australian Marsh Harrier. *See* Australasian Marsh Harrier  
 Australian Sparrowhawk. *See* Collared Sparrowhawk  
*australis*, *Geranoastur melanoleucus* 194, 642  
*australis*, *Phalacrocorax* 250, 802  
*axillaris*, *Falco* 100, 359  
*ayresii*, *Hieraaetus* 246, 763  
 Ayres's Eagle. *See* Ayres's Hawk Eagle  
 Ayres's Hawk Eagle **84** 246, 756, 763  
  
*babylonicus*, *Falco peregrinoides* 288, 922  
*badius*, *Accipiter* 138, 524  
*badius*, *Accipiter badius* 528  
 Bald Eagle **17** 112, 400  
*balkanensis*, *Geranoastur caeruleus* 617  
 Band-tailed Fishing-eagle. *See* Pallas's Fish-eagle  
 Banded Gymnogone. *See* African Gymnogone  
 Banded Harrier-eagle. *See* Banded Snake-eagle  
 Banded Snake-eagle **25** 128, 454. *See also* East African Snake-eagle  
 Barbary Falcon **110** 208, 919  
*barbatus*, *Cypaetus* 116, 411  
*barbatus*, *Cypaetus barbatus* 417  
 Barred Forest-falcon **89** 256, 817  
 Barred Hawk **54** 186, 619  
 Barred Honey-buzzard **10** 98, 346  
*bartelsi*, *Spizella* 292, 776  
*baru*, *Falco tinnunculus* 855  
 Bat Falcon **105** 288, 899. *See also* Bat-hawk  
 Bat Kite. *See* Bat-hawk  
 Bat Pern. *See* Bat-hawk  
 Bat-eating Buzzard. *See* Bat-hawk  
 Bat-eating Hawk. *See* Bat-hawk  
 Bat-hawk **8** 94, 350  
 Bateleur **23** 124, 455  
 Bateleur Eagle. *See* Bateleur  
*batesi*, *Accipiter cuculoides* 322  
*batesi*, *Dryotriachus spectabilis* 422  
*batu*, *Spilornis cheela* 459  
 Bawean Serpent-eagle **26** 130, 467  
*bawuanus*, *Spilornis* 130, 467  
 Bay-winged Hawk **59** 196, 636  
 Bearded Vulture. *See* Lammergeier  
*beaudouini*, *Circus* 126, 448  
 Beaudouin's Harrier-eagle. *See* Beaudouin's Snake-eagle  
 Beaudouin's Snake-eagle **24** 126, 448  
*belisarius*, *Aquila rapax* 288, 733  
*bellicosus*, *Polemaetus* 248, 792  
*bengalensis*, *Gyps* 120, 422  
*beniensis*, *Accipiter castanellus* 524  
*bergana*, *Falco* 284, 832  
 Besra **40** 158, 565  
*besta*, *Accipiter urogatus* 158, 567  
 Besra Sparrowhawk. *See* Besra  
*biarmicus*, *Falco* 292, 899  
*biarmicus*, *Falco biarmicus* 902  
*bicolor*, *Accipiter* 178, 586  
*bicolor*, *Accipiter bicolor* 588  
 Bicoloured Hawk **50** 178, 586  
 Bicoloured Sparrowhawk. *See* Bicoloured Hawk  
  
*bidentatus*, *Harpagus* 106, 366  
*bidentatus*, *Harpagus bidentatus* 367  
*bidu*, *Spilornis cheela* 459  
 Bismarck Goshawk. *See* New Britain Goshawk  
*bismarckii*, *Accipiter suberistata* 127  
 Black Baza **9** 96, 328  
 Black Buzzard-eagle/Eagle-buzzard. *See* Black-chested Eagle-buzzard  
 Black Caracara **88** 254, 796  
 Black Crab-hawk. *See* Common Black Hawk  
 Black Eagle. *See* Indian Black Eagle; Verreaux's Eagle  
 Black Falcon **103** 284, 895  
 Black Harrier **30** 138, 479  
 Black Hawk Eagle **73** 224, 784  
 Black Honey-buzzard **10** 98, 345  
 Black Kite **7** 92, 381  
 Black Merlin. *See* Merlin  
 Black Solitary-eagle **58** 194, 642  
 Black Sparrowhawk. *See* Great Sparrowhawk  
 Black Vulture **4** 86, 305. *See also* Monk Vulture  
 Black-and-chestnut Eagle. *See* Isidor's Eagle  
 Black-and-white Goshawk. *See* Great Sparrowhawk  
 Black-and-white Hawk Eagle **73** 224, 767. *See also* Blyth's Hawk Eagle  
 Black-breasted Buzzard. *See* Black-breasted Kite  
 Black-breasted Buzzard-kite. *See* Black-breasted Kite  
 Black-breasted Harrier-eagle. *See* Black-chested Snake-eagle  
 Black-breasted Kite **11** 100, 374  
 Black-breasted Snake-eagle. *See* Black-chested Snake-eagle  
 Black-cheeked Falcon. *See* Peregrine Falcon  
 Black-chested Buzzard-eagle/Eagle-buzzard. *See* Black-chested Eagle-buzzard  
 Black-chested Eagle. *See* Black-chested Eagle-buzzard  
 Black-chested Eagle-buzzard **58** 194, 640  
 Black-chested Harrier-eagle. *See* Black-chested Snake-eagle  
 Black-chested Hawk. *See* Barred Hawk  
 Black-chested Snake-eagle **24** 126, 450  
 Black-collared Hawk **59** 196, 639  
 Black-crested Baza. *See* Black Baza  
 Black-crested Lizard-hawk. *See* Black Baza  
 Black-eared Indian Kite. *See* Black Kite  
 Black-faced Hawk **55** 188, 620  
 Black-legged Falconet. *See* Black-thighed Falconet  
 Black-mantled Accipiter. *See* Black-mantled Goshawk  
 Black-mantled Goshawk **44** 166, 546. *See also* Great Sparrowhawk  
 Black-shouldered Kite **7** 92, 355  
 Black-sided Falconet. *See* Black-thighed Falconet  
 Black-tailed Falconet. *See* Black-thighed Falconet  
 Black-thighed Falconet **92** 262, 828  
 Black-winged Kite. *See* Black-shouldered Kite  
 Blue Kite. *See* Black-shouldered Kite  
 Blue-and-grey Goshawk/Sparrowhawk. *See* Slaty-backed Sparrowhawk  
 Blyth's Baza. *See* Jerdon's Baza  
 Blyth's Hawk Eagle **75** 228, 781  
 Bonelli's Eagle **83** 244, 750  
 Booted Eagle **83** 244, 756, 758  
 Booted Hawk Eagle. *See* Booted Eagle  
*bonalis*, *Buteo jamaicensis* 212, 685  
 Bornean Falconet. *See* White-fronted Falconet  
*bornensis*, *Accipiter jerdoni* 325  
*bougainvillei*, *Accipiter hagenster* 544  
*brachypterus*, *Buteo* 216, 695  
*brachyurus*, *Accipiter* 168, 571  
*brachyurus*, *Buteo* 204, 659  
*brachyurus*, *Buteo brachyurus* 661  
 Brahminy Kite **15** 108, 387

- brasiliensis*, *Ceryle alcyon* 86, 306  
*brunneiventris*, *Falco sparverius* 842  
*brunneus*, *Accipiter* 156, 528  
Broad-winged Buzzard. See Broad-winged Hawk  
Broad-winged Hawk 65 208, 656, 661  
Broadwing. See Broad-winged Hawk  
**brookii**, *Falco peregrinus* 300, 872, 917  
Brown Falcon 103 284, 832  
Brown Fish-/Sea-eagle. See Sanford's Fish-eagle  
Brown Goshawk 48 174, 537  
Brown Harrier-eagle. See Brown Snake-eagle  
Brown Hawk. See Brown Falcon  
Brown Lizard-hawk. See Jerdon's Baza  
Brown Snake-eagle 24 126, 451  
*brunneiceps*, *Buteo platypterus* 659  
*brutus*, *Accipiter francesii* 154, 536  
*buckleyi*, *Microtus* 258, 822  
Buckley's Forest-falcon 90 258, 822  
*buergersi*, *Erythrotrichus* 166, 602  
*buffoni*, *Circus* 136, 507  
Bürgers's Goshawk/Sparrowhawk. See Bürgers's Hawk  
Bürgers's Hawk 44 166, 602  
*burmanicus*, *Microhierax caeruleus* 262, 828  
*burmanicus*, *Spilornis cheela* 130, 459  
Burmese Hobby. See Oriental Hobby  
Burmese Pigmy Falcon. See White-rumped Pigmy-falcon  
*burmanus*, *Cathartes* 86, 309  
*buruensis*, *Accipiter fasciatus* 539  
*buteo*, *Buteo* 216, 686  
*buteo*, *Buteo buteo* 692  
*butandei*, *Accipiter gentilis* 599  
*butleri*, *Accipiter* 160, 533  
*butleri*, *Accipiter butleri* 534  
*butinensis*, *Accipiter chiodagaster* 525  
Buzzard. See Common Buzzard
- cachinnans*, *Herpetotheres* 254, 811  
*cachinnans*, *Herpetotheres cachinnans* 813  
Cackling Hawk. See Brown Falcon  
*caeruleus*, *Gymnospiza* 186, 615  
*caeruleus*, *Gymnospiza caeruleus* 616  
*caeruleus*, *Microhierax* 262, 826  
*caeruleus*, *Microhierax caeruleus* 828  
*caeruleus*, *Elanus* 92, 355  
*caeruleus*, *Elanus caeruleus* 358  
*calidus*, *Falco peregrinus* 917  
California Condor 5 88, 311  
*californianus*, *Gymnospiza* 88, 311  
*calurus*, *Buteo panamensis* 212, 685  
*calvus*, *Argypus* 120, 443  
*canadensis*, *Aquila chrysaetos* 236, 746  
*canariensis*, *Falco tinnunculus* 847  
*canescens*, *Accipiter tashiroi* 152, 523  
*caninus*, *Molurus* 146, 512  
Cape Griffon. See Cape Vulture  
Cape Verde Kite 7 92, 329  
Cape Vulture 22 122, 435  
Car Nicobar Shikra. See Nicobar Sparrowhawk  
Carancho. See Crested Caracara  
*caribaeorum*, *Falco sparverius* 842  
*carolinensis*, *Pandion haliaetus* 90, 320  
Carunculated Caracara 86 250, 798  
*carunculatus*, *Phalcoboenus* 250, 798  
*cassini*, *Falco peregrinus* 300, 918  
Cassin's Hawk Eagle 84 246, 770  
*castanilius*, *Accipiter* 150, 521  
*castanilius*, *Accipiter castanilius* 524  
*castanotus*, *Polihierax semitorquatus* 825  
*castroii*, *Accipiter trivirgatus* 519  
Cathartidae 305  
*caucase*, *Falco sparverius* 842  
*cayanensis*, *Leptodon* 104, 329  
Cayenne Kite. See Grey-headed Kite  
*ceatuae*, *Falco sparverius* 842  
*celebensis*, *Accipiter jerdoni* 96, 325  
*celebensis*, *Pernis* 98, 346  
*celebensis*, *Pernis celebensis* 348  
Celebes Crested Goshawk. See Sulawesi Crested Goshawk  
Celebes Dwarf/Little Sparrowhawk. See Sulawesi Small Sparrowhawk  
Celebes Hawk Eagle. See Sulawesi Hawk Eagle  
Celebes Serpent-eagle. See Sulawesi Serpent-eagle  
*celestoides*, *Accipiter badius* 148, 528  
*celestoides*, *Falco* 272, 854  
*celestoides*, *Falco celestoides* 855  
Central Nicobar Serpent-eagle 26 130, 461  
*ceylonensis*, *Accipiter erythrogastrus* 164, 525  
*ceylonensis*, *Spizactes cirrhatus* 230, 774  
*ceylonensis*, *Accipiter jerdoni* 96, 325  
Changeable Hawk Eagle 76 230, 771  
Chanting Goshawk. See Dark Chanting-goshawk  
*cheela*, *Spilornis* 130, 457  
*cheela*, *Spilornis cheela* 459  
*cherryway*, *Catagama planus* 252, 805  
*cherrug*, *Falco* 294, 903  
*cherrug*, *Falco cherrug* 906  
Chestnut-bellied Eagle. See Rufous-bellied Hawk Eagle  
Chestnut-bellied Sparrowhawk. See Chestnut-flanked Sparrowhawk  
Chestnut-flanked Sparrowhawk 26 130, 523  
Chestnut-shouldered Goshawk. See Bürgers's Hawk  
Chicken Hawk. See Broad-winged Hawk; Cooper's Hawk  
*chiqueta*, *Falco* 286, 862  
*chiqueta*, *Falco chiqueta* 864  
*chilensis*, *Accipiter bicolor* 176, 588  
Chimachima Caracara. See Yellow-headed Caracara  
*chimachima*, *Mitrospiza* 252, 806  
Chimango. See Chimango Caracara  
Chimango Caracara 87 252, 808  
Chimango Hawk. See Chimango Caracara  
*chimango*, *Mitrospiza* 252, 808  
*chimango*, *Mitrospiza chimango* 809  
Chinese Goshawk. See Chinese Sparrowhawk  
Chinese Sparrowhawk 40 158, 531  
*chionogaster*, *Accipiter striatus* 176, 585  
*chrysaetos*, *Aquila* 236, 742  
*chrysaetos*, *Aquila chrysaetos* 746  
Ciconiiformes 305  
*cinnamomeus*, *Circus* 128, 454  
*cinnamomeus*, *Polihierax magnus* 208, 826  
Cinereous Harrier 29 136, 486  
Cinereous Vulture. See Monk Vulture  
*cinnereus*, *Circus* 126, 451  
*cinnereus*, *Circus* 136, 486  
*cinnamominus*, *Falco sparverius* 274, 842  
Cinnamon-winged Buzzard. See Rufous-winged Buzzard-hawk  
*circumcinctus*, *Spizopteryx* 258, 810  
*cirrhatus*, *Spizactes* 230, 771  
*cirrhatus*, *Spizactes cirrhatus* 774  
*cirrhocephalus*, *Accipiter* 174, 569  
*cirrhocephalus*, *Accipiter cirrhocephalus* 571  
*citensis*, *Buteo rufinus* 218, 700  
*clanga*, *Aquila* 230, 727  
Collared Falconet 92 262, 826  
Collared Forest-falcon 90 258, 820

- Collared Sparrowhawk **48** [174](#), [569](#)  
*collaris*, Accipiter [180](#), [559](#)  
*coloratus*, Buteo albicaudatus [206](#), [670](#)  
*columbarius*, Falco [200](#), [877](#)  
*columbarius*, Falco columbarius [880](#)  
Common Black Hawk **57** [192](#), [631](#)  
Common Black-shouldered Kite. *See* Black-shouldered Kite  
Common Buzzard **69** [216](#), [686](#)  
Common Caracara. *See* Crested Caracara  
Common Kestrel **95** [261](#), [847](#)  
Common Kite. *See* Black Kite  
Common Saker. *See* Saker Falcon  
*concentricus*, Micrastur ruficollis [815](#)  
*concolor*, Falco [278](#), [872](#)  
*confusus*, Accipiter virgatus [158](#), [567](#)  
Congo Serpent-eagle. *See* West African Serpent-eagle  
*conspicuus*, Buteo magnirostris [650](#)  
*cooperi*, Accipiter [176](#), [588](#)  
Cooper's Hawk **49** [176](#), [588](#)  
Cooper's Sparrowhawk. *See* Cooper's Hawk  
*coprothera*, Gyps [129](#), [435](#)  
*coronatus*, Harpyhaliaetus [134](#), [614](#)  
*coronatus*, Stephanoaetus [248](#), [788](#)  
*costaricensis*, Buteo jamaicensis [685](#)  
*costaricensis*, Buteo nitidus [648](#)  
*costaricensis*, Leucopternis albirostris [625](#)  
*coulteri*, Avicula uerberata [127](#)  
Cranes-hawk **54** [186](#), [615](#)  
Crested Baza. *See* Pacific Baza  
Crested Caracara **87** [272](#), [808](#)  
Crested Eagle **72** [221](#), [715](#)  
Crested Goshawk **41** [130](#), [518](#)  
Crested Hawk. *See* Pacific Baza  
Crested Honey-buzzard. *See* Eastern Honey-buzzard  
Crested Lizardhawk. *See* Jerdon's Baza  
Crested Serpent-eagle **26** [130](#), [457](#)  
*crissatus*, Pseudis haliaetus [90](#), [170](#)  
*crissati*, Accipiter tachiro [531](#)  
Crowned Eagle. *See* Crowned Hawk Eagle; Crowned Solitary-Eagle  
Crowned Hawk Eagle **85** [248](#), [788](#)  
Crowned Solitary-eagle **26** [130](#), [644](#)  
Cuban Black Hawk. *See* Common Black Hawk  
Cuban Hawk. *See* Gumlach's Hawk  
*cubanensis*, Buteo platypterus [208](#), [659](#)  
*cuculoides*, Avicula [94](#), [121](#)  
*cuculoides*, Avicula cuculoides [122](#)  
*cuvieri*, Falco [280](#), [885](#)  
*cyaneus*, Corvus [140](#), [142](#), [481](#)
- dacotiae*, Falco trinnaculus [264](#), [847](#)  
*dampieri*, Accipiter hiogaster [172](#), [544](#)  
*daphanea*, Aquila chrysaetos [746](#)  
Daptritiidae [296](#)  
Dark Chanting-goshawk **34** [146](#), [509](#)  
Darwin's Caracara **86** [250](#), [801](#)  
*davisoni*, Spilornis cheela [130](#), [459](#)  
*decoloratus*, Falco [288](#), [922](#)  
Desert Buzzard. *See* Common Buzzard  
*dickinsoni*, Falco [268](#), [560](#)  
Dickinson's Kestrel **95** [268](#), [860](#)  
*dilinus*, Accipiter fasciatus [174](#), [539](#)  
*dionisi*, Harpagus [106](#), [268](#)  
*dogua*, Accipiter fasciatus [539](#)  
*dominicensis*, Falco sparverius [842](#)  
*dortae*, Megalonyx [166](#), [605](#)  
Doria's Goshawk. *See* Doria's Hawk  
Doria's Hawk **44** [166](#), [605](#)
- Double-toothed Kite **14** [106](#), [366](#)  
Duck-hawk. *See* Peregrine Falcon  
*dussumieri*, Accipiter badius [148](#), [528](#)
- Eaglehawk. *See* Wedge-tailed Eagle  
Eared Indian Kite. *See* Black Kite  
East African (Banded) Snake-eagle **25** [128](#), [452](#)  
Eastern Chanting-goshawk **34** [146](#), [511](#)  
Eastern Goshawk. *See* Northern Goshawk  
Eastern Honey-buzzard **10** [98](#), [347](#)  
Eastern Imperial Eagle. *See* Imperial Eagle  
Eastern Marsh Harrier. *See* Northern Marsh Harrier  
Eastern Pale Chanting-goshawk. *See* Eastern Chanting-goshawk  
Eastern Red-footed Falcon **99** [276](#), [867](#)  
Eastern Sparrowhawk. *See* Japanese Sparrowhawk  
*evandoratus*, Terathopius [124](#), [455](#)  
*evandoratus*, Buteo magnirostris [650](#)  
Egyptian Vulture **19** [116](#), [417](#)  
*eichhorni*, Accipiter albogularis [549](#)  
*elegans*, Buteo lineatus [212](#), [656](#)  
*elouanai*, Falco [278](#), [869](#)  
Elesonora's Falcon **100** [278](#), [869](#)  
*elgini*, Spilornis [132](#), [461](#)  
*elangeri*, Falco bairdii [292](#), [902](#)  
*elangeri*, Gyps rueppellii [129](#), [429](#)  
Erne. *See* White-tailed Fish-eagle  
*eresti*, Falco peregrinus [301](#), [302](#), [917](#)  
*erythruchen*, Accipiter [161](#), [572](#)  
*erythruchen*, Accipiter erythruchen [573](#)  
*erythrogenys*, Micruastur [202](#), [830](#)  
*erythronemus*, Accipiter striatus [176](#), [585](#)  
*erythropus*, Accipiter [150](#), [560](#)  
*erythropus*, Accipiter erythropus [561](#)  
Eurasian Black Vulture. *See* Monk Vulture  
Eurasian Buzzard. *See* Common Buzzard  
Eurasian Griffon. *See* Griffon Vulture  
Eurasian Hobby. *See* Northern Hobby  
Eurasian Honey-buzzard. *See* Western Honey-buzzard  
Eurasian Kestrel. *See* Common Kestrel  
Eurasian Marsh Harrier. *See* Northern Marsh Harrier  
Eurasian Sparrowhawk. *See* Northern Sparrowhawk  
European Black Vulture. *See* Monk Vulture  
European Griffon. *See* Griffon Vulture  
European Honey-buzzard. *See* Western Honey-buzzard  
European Snake-eagle. *See* Short-toed Snake-eagle  
Everglade Kite. *See* Snail Kite  
*exul*, Buteo [202](#), [673](#)  
*extimus*, Accipiter tringoides [519](#)  
*extimus*, Buteo lineatus [656](#)
- Falconidae [828](#)  
Falconiformes [296](#)  
*fallandrius*, Cathartes aura [308](#)  
Fasciated Snake-eagle. *See* East African (Banded) Snake-Eagle  
*fasciatus*, Accipiter [174](#), [537](#)  
*fasciatus*, Accipiter fasciatus [539](#)  
*fasciatus*, Harpagus bidentatus [106](#), [267](#)  
*fasciatus*, Harporhynchus [241](#), [750](#)  
*fasciatus*, Harporhynchus fasciatus [753](#)  
*fasciicauda*, Milvus [92](#), [179](#)  
*fasciinucha*, Falco [208](#), [924](#)  
Fasciolated Snake-eagle. *See* East African (Banded) Snake-Eagle  
*fasciolatus*, Caracara [128](#), [452](#)  
Feather-toed Hawk Eagle. *See* Mountain Hawk Eagle  
*feldeggii*, Falco bairdii [292](#), [902](#)

- femoratus*, *Falco* 286, 875  
*femoratus*, *Falco femoratus* 876  
*ferrandensis*, *Falco sparverius* 542  
**Ferruginous Buzzard**. See **Ferruginous Hawk**  
**Ferruginous Hawk** **66** 210, 665, 702, 707  
**Ferruginous Roughleg/Rough-legged Hawk**. See **Ferruginous Hawk**  
*fulens*, *Accipiter bicolor* 588  
**Fielden's Falconet**. See **White-rumped Pygmy-falcon**  
*fieldi*, *Falco rupestris* 206, 857  
**Fiji Goshawk** **42** 164, 549  
**Fish Eagle**. See **African Fish-eagle**  
**Fish Hawk**. See **Osprey**  
**Fishing Buzzard/Hawk**. See **Black-collared Hawk**  
*flaviventris*, *Haliastur indus* 108, 390  
*florus*, *Aquila audax* 254, 748  
*florus*, *Certhiaspiza corvulescens* 186, 617  
*florus*, *Syrnium carinatus* 290, 774  
*fulens*, *Corugya atratus* 86, 306  
*fulviventris*, *Accipiter superciliosus* 180, 550  
*fulviventris*, *Leptodon* 331  
**Forbes's Kite** 331  
**Forest Buzzard**. See **Mountain Buzzard**  
**Forest Vulture**. See **Greater Yellow-headed Vulture**  
*fulviventris*, *Elanoides* 106, 348  
*fulviventris*, *Elanoides fulviventris* 349  
**Fork-tailed Kite**. See **Black Kite**, **Scissor-tailed Kite**  
*fulviventris*, *Accipiter tringoides* 519  
*fulviventris*, *Hieronax kienersi* 290, 767  
**Forster's Catagata** **86** 250, 802  
**Fox Kestrel** **94** 266, 857  
**France's Sparrowhawk**. See **France's Sparrowhawk**  
*francesii*, *Accipiter* 154, 535  
*francesii*, *Accipiter francesii* 535  
**France's Goshawk**. See **France's Sparrowhawk**  
**France's Sparrowhawk** **38** 154, 535  
*fringillarius*, *Micropodops* 262, 828  
*fringilloides*, *Accipiter striatus* 585  
**Frog Hawk**. See **Grey-faced Buzzard-hawk**  
*fruticis*, *Falco peregrinus* 917  
*frutescens*, *Buteo jamaicensis* 685  
*fujiyamae*, *Accipiter gentilis* 592  
*fuliginosus*, *Buteo badius* 204, 661  
*fulviventris*, *Cyfa fulviventris* 118, 435  
*fulviventris*, *Heptotheca eximiosa* 254, 813  
*fulvus*, *Cyfa* 118, 431  
*fulvus*, *Cyfa fulvus* 434  
*fulvus*, *Buteo jamaicensis* 685  
*fuscipennis*, *Accipiter virgatus* 567
- Gabar Goshawk** **34** 146, 514  
*gabar*, *Micronus* 146, 514  
*galapagensis*, *Buteo* 198, 667  
**Galapagos Buzzard**. See **Galapagos Hawk**  
**Galapagos Hawk** **60** 198, 667  
*gallicus*, *Circus* 126, 445  
*gentilis*, *Accipiter* 156, 595  
*gentilis*, *Accipiter gentilis* 599  
*giesbreghii*, *Leucopternis albertina* 190, 625  
*gibbicollis*, *Micropodops* 256, 815  
*gibbus*, *Accipiter albogularis* 170, 542  
*gingianus*, *Neophron percnopterus* 116, 420  
*grieneri*, *Haliastur indus* 108, 390  
**Golden Eagle** **78** 236, 742  
**Goshawk**. See **Northern Goshawk**  
*gouldi*, *Circus approximans* 144, 505  
*gouldi*, *Milvus migrans* 92, 385  
*gracilis*, *Buteo magnirostris* 650  
*gracilis*, *Certhiaspiza corvulescens* 186, 616  
*gracilis*, *Accipiter novus* 581  
**Grasshopper Buzzard**. See **Grasshopper Buzzard-hawk**  
**Grasshopper Buzzard-hawk** **52** 182, 608  
**Gray's Goshawk**. See **Moluccan Goshawk**  
**Great Black Hawk** **52** 192, 632  
**Great Nicobar Serpent-eagle** **27** 132, 462  
**Great Philippine Eagle**. See **Philippine Eagle**  
**Great Sparrowhawk** **37** 152, 515, 592  
**Greater Fishing-eagle**. See **Grey-headed Fishing-eagle**  
**Greater Kestrel**. See **White-eyed Kestrel**  
**Greater Spotted Eagle** **81** 240, 727  
**Greater Yellow-headed Vulture** **4** 86, 310  
**Greenland Falcon**. See **Gyr Falcon**  
**Grey Falcon** **102** 280, 892  
**Grey Frog Hawk**. See **Chinese Sparrowhawk**  
**Grey Goshawk** **42** 172, 549. See also **Chinese Sparrowhawk**  
**Grey Hawk**. See **Grey-lined Hawk**  
**Grey Kestrel** **95** 268, 858  
**Grey-backed Hawk** **56** 190, 626  
**Grey-backed Sea-eagle**. See **White-bellied Fish-eagle**  
**Grey-bellied Goshawk** **51** 180, 516  
**Greybellied Hawk**. See **Greybellied Goshawk**  
**Grey-faced Buzzard-hawk** **53** 184, 617  
**Grey-faced Buzzard-eagle**. See **Grey-faced Buzzard-hawk**  
**Grey-headed Fish-eagle**. See **Grey-headed Fishing-eagle**  
**Grey-headed Fishing-eagle** **18** 114, 410  
**Grey-headed Goshawk** **44** 166, 555  
**Grey-headed Kite** **15** 104, 329  
**Grey-lined Buzzard**. See **Grey-lined Hawk**  
**Grey-lined Hawk** **65** 208, 646, 658  
**Grey-throated Goshawk** **42** 172, 545  
**Grey-throated Sparrowhawk**. See **Moluccan Sparrowhawk**  
**Griffon Vulture** **20** 118, 431  
*griseiceps*, *Accipiter* 160, 520  
*griseicauda*, *Buteo magnirostris* 200, 650  
*griseogularis*, *Accipiter* 172, 545  
*griseogularis*, *Accipiter griseogularis* 545  
*griseus*, *Accipiter francesii* 154, 535  
*griffus*, *Vultur* 88, 313  
*griffus*, *Micropodops ruficollis* 256, 815  
**Guiana Crested Eagle**. See **Crested Eagle**  
*guanensis*, *Morphnus* 282, 715  
*gularis*, *Accipiter* 158, 563  
*gularis*, *Accipiter gularis* 563  
*gundlachi*, *Accipiter* 178, 590  
*gundlachi*, *Accipiter gundlachi* 592  
*gundlachi*, *Buteogallus anthracinus* 192, 632  
**Gundlach's Goshawk**. See **Gundlach's Hawk**  
**Gundlach's Hawk** **50** 178, 590  
*gurneyi*, *Aquila* 254, 740  
*gurneyi*, *Asio vulturatus* 327  
**Gurney's Buzzard**. See **Gurney's Hawk**  
**Gurney's Eagle** **78** 254, 740  
**Gurney's Hawk** **62** 202, 665, 674, 708  
*guttifer*, *Accipiter bicolor* 178, 588  
**Gyr**. See **Gyr Falcon**  
**Gyr Falcon** **102** 280, 898
- haliaetus*, *Pandion* 301, 317  
*haliaetus*, *Pandion haliaetus* 320  
*hamatus*, *Rosthamus* 102, 365  
*hanzhi*, *Falco longipennis* 889  
*haplochromis*, *Accipiter* 168, 550  
*harlani*, *Buteo jamaicensis* 212, 685  
**Harlan's Hawk**. See **Red-tailed Hawk**  
*harmandi*, *Polihierax insignis* 260, 826  
**Harpy Eagle** **72** 224, 717

- harpyja*, *Harpyia* [222](#), [217](#)  
 Harris' / Harris's Hawk. *See* Bay-winged Hawk  
*harrisi*, *Parabuteo unicinctus* [196](#), [638](#)  
*harterti*, *Circus aeruginosus* [502](#)  
*haudata*, *Aquila pomarina* [240](#), [227](#)  
 Hawaiian Buzzard. *See* Hawaiian Hawk  
 Hawaiian Hawk [60](#) [198](#), [677](#)  
*helaca*, *Aquila* [236](#), [232](#)  
*helaca*, *Aquila helaca* [240](#)  
*hellmayri*, *Accipiter fuscatus* [539](#)  
*hemlanius*, *Buteo* [214](#), [700](#)  
 Hen Harrier [32](#) [140](#), [142](#), [481](#)  
*henricus*, *Accipiter* [164](#), [551](#)  
*hensti*, *Accipiter* [154](#), [594](#)  
 Henst's Goshawk [38](#) [154](#), [594](#)  
 Herpetotheriidae [810](#)  
 Himalayan Grey-headed Fishing-eagle. *See* Lesser Fishing-eagle  
 Himalayan Vulture [20](#) [118](#), [430](#)  
*himalayensis*, *Cyps* [118](#), [430](#)  
*huognaster*, *Accipiter* [172](#), [541](#)  
*huognaster*, *Accipiter huognaster* [544](#)  
 Hispaniolan Hawk. *See* Ridgway's Hawk  
 Hobby. *See* Northern Hobby  
 Hodgson's Hawk Eagle. *See* Mountain Hawk Eagle  
*hodespalus*, *Spilornis* [132](#), [462](#)  
*homeri*, *Aquila chrysaetos* [246](#)  
 Honey Buzzard. *See* Western Honey-buzzard  
 Hooded Vulture [19](#) [116](#), [421](#)  
 Hook-billed Kite [12](#) [102](#), [332](#)  
*hoebueghi*, *Falco chiqueira* [894](#)  
 Horsfield's Sparrowhawk. *See* Chinese Sparrowhawk  
*hoya*, *Spilornis cheela* [459](#)  
*hudsonius*, *Circus* [136](#), [483](#)  
*humilis*, *Ichthyophaga* [114](#), [410](#)  
*humilis*, *Ichthyophaga humilis* [410](#)  
*hypoleucus*, *Elanus caeruleus* [358](#)  
*hypoleucus*, *Falco* [282](#), [892](#)  
*hypoleucoides*, *Buteo albicaudatus* [206](#)  
*hypoleucoides*, *Buteo albicaudatus* [670](#)  
  
 Iceland Falcon. *See* Gyr Falcon  
*ichthyactis*, *Ichthyophaga* [114](#), [410](#)  
*'ignescens'*, *Melanerpes metalater* [511](#)  
*imitator*, *Accipiter* [170](#), [554](#)  
 Imitator Hawk-Goshawk. *See* Imitator Sparrowhawk  
 Imitator Sparrowhawk [46](#) [170](#), [554](#)  
 Imperial Eagle [79](#) [236](#), [737](#)  
 Indian Black Eagle [74](#) [226](#), [722](#)  
 Indian Crested Hawk Eagle. *See* Changeable Hawk Eagle  
 Indian Griffon / Vulture. *See* Long-billed Vulture  
 Indian Hobby. *See* Oriental Hobby  
 Indian Sparrowhawk. *See* Shikra  
 Indian Vulture. *See* Egyptian Vulture  
*indicus*, *Accipiter trivirgatus* [160](#), [519](#)  
*indicus*, *Buteo* [184](#), [612](#)  
*indicus*, *Cyps* [120](#), [426](#)  
*indicus*, *Cyps indicus* [428](#)  
*indus*, *Haliastur* [108](#), [387](#)  
*indus*, *Haliastur indus* [391](#)  
*infuscatus*, *Henicopernis* [308](#), [333](#)  
 Insect Hawk. *See* Roadside Hawk  
*insulatrix*, *Buteo magnirostris* [650](#)  
*insignis*, *Falco indumbarrus* [290](#), [890](#)  
*insignis*, *Poliobronx* [260](#), [825](#)  
*insignis*, *Poliobronx insignis* [826](#)  
*insulicola*, *Buteo platypterus* [208](#), [659](#)  
*intermedius*, *Haliastur indus* [390](#)  
  
*interpres*, *Micrastur ruficollis* [815](#)  
*interstinctus*, *Falco tinnunculus* [847](#)  
*isabellinus*, *Falco sparverius* [274](#), [842](#)  
*isidori*, *Onaetus* [222](#), [790](#)  
 Isidor's Crested Eagle. *See* Isidor's Eagle  
 Isidor's Eagle [72](#) [222](#), [790](#)  
*isura*, *Lophocircus* [100](#), [372](#)  
*iswahia*, *Accipiter gularis* [565](#)  
  
 Jackal Buzzard [71](#) [220](#), [712](#)  
*jamaicensis*, *Buteo* [232](#), [681](#)  
*jamaicensis*, *Buteo jamaicensis* [685](#)  
 Japanese Buzzard. *See* Common Buzzard  
 Japanese Lesser Sparrowhawk. *See* Japanese Sparrowhawk  
 Japanese Sparrowhawk [40](#) [158](#), [563](#)  
*japonensis*, *Falco peregrinus* [917](#)  
*japonica*, *Aquila chrysaetos* [246](#)  
*japonicus*, *Buteo buteo* [216](#), [693](#)  
 Java Hawk Eagle. *See* Javan Hawk Eagle  
 Javan Hawk Eagle [77](#) [252](#), [276](#)  
*javanicus*, *Accipiter trivirgatus* [519](#)  
*javensis*, *Falco moluccensis* [272](#), [853](#)  
*jefferyi*, *Pitheophaga* [226](#), [721](#)  
 Jet Falcon. *See* Gyr Falcon  
*jerdoni*, *Accipiter* [96](#), [324](#)  
*jerdoni*, *Accipiter jerdoni* [325](#)  
 Jerdon's Baza [9](#) [96](#), [324](#)  
 Johnny Rook. *See* Forster's Caracara  
*jota*, *Colaptes auratus* [86](#), [308](#)  
 Juan Fernández Buzzard. *See* Juan Fernández Hawk  
 Juan Fernández Hawk [62](#) [202](#), [677](#)  
*juggeri*, *Falco* [292](#), [898](#)  
  
*kamtschatkensis*, *Buteo lagopus* [710](#)  
 Kapul Eagle. *See* New Guinea Eagle  
*kashmiricus*, *Accipiter virgatus* [567](#)  
 Katchall Shikra. *See* Nicobar Sparrowhawk  
*kelanensis*, *Spizacus nipalensis* [228](#), [776](#)  
*kemisi*, *Buteo jamaicensis* [685](#)  
 Kestrel. *See* Common Kestrel  
*kieneri*, *Hieraaetus* [230](#), [765](#)  
*kieneri*, *Hieraaetus kieneri* [767](#)  
 Kinabalu Serpent-eagle [26](#) [130](#), [466](#)  
*kinabaluensis*, *Spilornis* [130](#), [466](#)  
 King Vulture [5](#) [88](#), [115](#). *See also* Lappet-faced Vulture  
*klassi*, *Spilornis* [132](#), [462](#)  
 Krieger's Hawk. *See* Red-tailed Hawk  
*kukli*, *Leucopernis* [188](#), [621](#)  
  
*lacernulata*, *Leucopernis* [188](#), [622](#)  
 Laggat Falcon [107](#) [282](#), [898](#)  
*lagopus*, *Buteo* [214](#), [704](#)  
*lagopus*, *Buteo lagopus* [710](#)  
*laingi*, *Accipiter gentilis* [599](#)  
 Lammergeier [19](#) [116](#), [413](#)  
*lanceolatus*, *Spizacus* [232](#), [778](#)  
 Lanner. *See* Lanner Falcon  
 Lanner Falcon [107](#) [282](#), [899](#)  
 Lappet-faced Vulture [25](#) [124](#), [439](#)  
 Large Indian Kite. *See* Black Kite  
 Large-billed Hawk. *See* Roadside Hawk  
*latifrons*, *Murshiana* [260](#), [829](#)  
 Laughing-falcon [88](#) [254](#), [811](#)  
 Laughing-hawk. *See* Laughing-falcon  
*lavongai*, *Accipiter hughesii* [544](#)  
*layardi*, *Accipiter trivirgatus* [160](#), [519](#)  
 Legge's Baza. *See* Jerdon's Baza  
 Legge's Hawk Eagle. *See* Mountain Hawk Eagle

- leonei*, *Gampsonyx swainsonii* 106, 353  
 Lesser Black Hawk. *See* Common Black Hawk  
 Lesser Collared Forest-falcon. *See* Buckley's Forest-falcon  
 Lesser Fish-eagle. *See* Lesser Fishing-eagle  
 Lesser Fishing-eagle 18 114, 408  
 Lesser Kestrel 94 266, 834  
 Lesser Spotted Eagle 81 240, 724  
 Lesser Yellow-headed Vulture 4 86, 309  
 Letter-winged Kite 11 100, 361  
*leucocephalus*, *Buteo* *leucocephalus* 196, 641  
*leucocephalus*, *Haliaeetus* 112, 401  
*leucogaster*, *Haliaeetus* 108, 391  
*leucorhous*, *Buteo* 200, 650  
*leucorhous*, *Haliaeetus* 114, 398  
*leucosomus*, *Accipiter* *leucosomus* 172, 544  
*leucurus*, *Elanus* 102, 353  
*leucurus*, *Elanus leucurus* 355  
*leuphotes*, *Accipiter* 96, 328  
*leuphotes*, *Accipiter leuphotes* 329  
 Levant Sparrowhawk 39 156, 528  
*levis*, *Rosthamus sociabilis* 365  
*lihinensis*, *Accipiter* *lihinensis* 544  
*limnastus*, *Spizastur* *limnastus* 230, 774  
*lineatus*, *Buteo* 212, 653  
*lineatus*, *Buteo lineatus* 656  
*lineatus*, *Mitrus nigrans* 92, 385  
 Lined Forest-falcon 89 256, 815  
 Little Banded Goshawk. *See* Shikra  
 Little Eagle 28 234, 761  
 Little Falcon. *See* Australian Hobby  
 Little Hawk. *See* Collared Sparrowhawk  
 Little Pied Goshawk/Sparrowhawk. *See* Imitator Sparrowhawk  
 Little Sparrowhawk 36 150, 561. *See also* Chinese Sparrowhawk  
*livens*, *Certhia* *livens* 617  
*liventer*, *Buteo* 184, 609  
 Lizard Hawk. *See* Pacific Baza  
 Lizard-buzzard 52 182, 613  
 Long-billed Griffon. *See* Long-billed Vulture  
 Long-billed Vulture 21 120, 426  
 Long-crested Eagle 84 240, 769  
 Long-crested Hawk Eagle. *See* Long-crested Eagle  
 Long-legged Buzzard 20 218, 696  
 Long-tailed Buzzard. *See* Long-tailed Honey-buzzard  
 Long-tailed Hawk 52 182, 606  
 Long-tailed Honey-buzzard 10 98, 334  
 Long-tailed Serpent-eagle. *See* Madagascar Serpent-eagle  
 Long-winged Harrier 29 136, 507  
 Long-winged Kite. *See* Square-tailed Kite  
*longicauda*, *Heteropernis* 98, 334  
*longipennis*, *Falco* 282, 888  
*longipennis*, *Falco longipennis* 889  
*lopezi*, *Accipiter* *lopezi* 523  
*luteschistocerus*, *Accipiter* 168, 552  
*lymani*, *Falco columbarius* 880  
*macropus*, *Falco peregrinus* 300, 302, 918  
*macroscelus*, *Circus maillandi* 138, 506  
*macroscelides*, *Accipiter* *macroscelides* 152, 523  
*macrourus*, *Circus* 140, 488  
*macrourus*, *Urotrichus* 182, 606  
 Madagascar (Marsh) Harrier. *See* Malagasy Marsh Harrier  
 Madagascar Banded Kestrel. *See* Madagascar Barred Kestrel  
 Madagascar Barred Kestrel 95 268, 861  
 Madagascar Baza. *See* Madagascar Cuckoo-hawk  
 Madagascar Buzzard 69 216, 695  
 Madagascar Cuckoo-falcon. *See* Madagascar Cuckoo-hawk  
 Madagascar Cuckoo-hawk 8 94, 323  
 Madagascar Fish-eagle 16 110, 396  
 Madagascar Forest Eagle. *See* Madagascar Serpent-eagle  
 Madagascar Goshawk. *See* Frances's Sparrowhawk; Heron's Goshawk  
 Madagascar Gymnogene 28 134, 476  
 Madagascar Harrier-hawk. *See* Madagascar Gymnogene  
 Madagascar Kestrel. *See* Malagasy Spotted Kestrel  
 Madagascar Sea-eagle. *See* Madagascar Fish-eagle  
 Madagascar Serpent-eagle 28 134, 472  
 Madagascar Sparrowhawk 38 134, 527  
 Madagascar Spotted Kestrel. *See* Malagasy Spotted Kestrel  
*madagascariensis*, *Accipiter* 154, 527  
*madagascariensis*, *Accipiter* 94, 323  
*madens*, *Falco peregrinus* 300, 917  
*madensis*, *Accipiter* *madensis* 585  
*magniplumis*, *Buteo magnirostris* 200, 650  
*magnirostris*, *Accipiter* *magnirostris* 325  
*magnirostris*, *Buteo* 200, 648  
*magnirostris*, *Buteo magnirostris* 650  
*magnus*, *Gampsonyx swainsonii* 353  
*maillandi*, *Circus* 138, 505  
*maillandi*, *Circus maillandi* 506  
*major*, *Rosthamus sociabilis* 365  
*majorculus*, *Elanus leucurus* 355  
 Malagasy Goshawk. *See* Frances's Sparrowhawk  
 Malagasy Marsh Harrier 30 138, 505  
 Malagasy Spotted Kestrel 96 270, 848  
*malaitae*, *Accipiter* *malaitae* 544  
 Malay Falconet. *See* Black-thighed Falconet  
*malayensis*, *Ictinartus* 226, 722  
*malayensis*, *Ictinartus malayensis* 724  
*malayensis*, *Spilornis cheela* 459  
 Manchurian Falcon. *See* Eastern Red-footed Falcon  
 Manchurian Red-footed Falcon. *See* Eastern Red-footed Falcon  
 Mangrove Black Hawk 57 192, 629  
 Mantled Hawk 56 190, 627  
*manus*, *Accipiter* *manus* 544  
 Marsh Hawk. *See* Northern Harrier  
 Marsh Hawk Eagle. *See* Changeable Hawk Eagle  
 Martial Eagle 85 248, 792  
*matthiae*, *Accipiter* *matthiae* 544  
 Mauritius Kestrel 96 270, 849  
*maurus*, *Circus* 138, 479  
*mechowi*, *Melierax mechowi* 146, 510  
*megala*, *Accipiter* *megala* 327  
*megalopterus*, *Phalacrocorax* 250, 799  
*melambrotus*, *Cathartes* 86, 310  
*melanochlamys*, *Accipiter* 166, 546  
*melanoleucus*, *Accipiter* 152, 592  
*melanoleucus*, *Accipiter melanoleucus* 594  
*melanoleucus*, *Circus* 134, 491  
*melanoleucus*, *Certhia* 194, 640  
*melanoleucus*, *Certhia melanoleucus* 642  
*melanoleucus*, *Microhuras* 262, 831  
*melanoleucus*, *Spizastur* 224, 767  
*melanops*, *Leucopernis* 188, 620  
*melanosternon*, *Hamirostra* 100, 374  
*melanota*, *Spilornis cheela* 130, 459  
*melaschistos*, *Accipiter* *melaschistos* 156, 581  
*menetriesi*, *Buteo* *menetriesi* 693  
 Mentawai Serpent-eagle 26 130, 464  
*menzbieri*, *Buteo lagopus* 214, 710  
*meridionalis*, *Buteo lagopus* 196, 635  
*meridionalis*, *Cathartes aura* 308  
*meridionalis*, *Cypsaetus barbatus* 116, 417  
*meridionalis*, *Kaupfalco monogrammus* 615  
 Merlin 106 200, 877

- metabates*, *Melierax* [146](#), [509](#)  
*metabates*, *Melierax metabates* [510](#)  
 Mexican Eagle. *See* Crested Caracara  
 Mexican Goshawk. *See* Grey-lined Hawk  
*mexicanus*, *Falco* [294](#), [896](#)  
*meyerianus*, *Accipiter* [170](#), [680](#)  
 Meyer's Goshawk [46](#) [170](#), [680](#)  
*microbala*, *Falco moluccensis* [272](#), [853](#)  
*microtictus*, *Accipiter tringatus* [160](#), [519](#)  
*migrans*, *Milvus* [92](#), [381](#)  
*migrans*, *Milvus migrans* [385](#)  
*mitripes*, *Falco cherrug* [294](#), [896](#)  
*milvus*, *Milvus* [92](#), [376](#)  
*minimus*, *Spilornis* [190](#), [461](#)  
*minor*, *Falco peregrinus* [902](#), [917](#)  
*minullus*, *Accipiter* [150](#), [561](#)  
*mirandolles*, *Micrastur* [256](#), [818](#)  
*mirna*, *Chondrohierax uncinatus* [334](#)  
*misoriensis*, *Accipiter hircaster* [544](#)  
 Mississippi Kite [13](#) [104](#), [370](#)  
*mississippiensis*, *Ictinia* [104](#), [370](#)  
*misulae*, *Accipiter hircaster* [544](#)  
 Moluccan Banded Goshawk. *See* Moluccan Goshawk  
 Moluccan Goshawk [45](#) [164](#), [551](#)  
 Moluccan Kestrel [97](#) [272](#), [852](#)  
 Moluccan Sparrowhawk [45](#) [164](#), [572](#)  
*moluccensis*, *Falco* [272](#), [852](#)  
*moluccensis*, *Falco moluccensis* [853](#)  
*monachus*, *Argypius* [118](#), [437](#)  
*monachus*, *Neropytes* [116](#), [421](#)  
*monachus*, *Neropytes monachus* [422](#)  
 Mongolian Buzzard. *See* Upland Buzzard  
 Monk Vulture [20](#) [118](#), [437](#)  
 Monkey-eating Eagle. *See* Philippine Eagle  
*monogrammicus*, *Kaupifalco* [182](#), [613](#)  
*monogrammicus*, *Kaupifalco monogrammicus* [613](#)  
 Montagu's Harrier [51](#) [140](#), [493](#)  
*morphnoides*, *Hieronax* [254](#), [761](#)  
*morphnoides*, *Hieronax morphnoides* [763](#)  
*mortyi*, *Accipiter griseogularis* [172](#), [546](#)  
 Mountain Buzzard [71](#) [290](#), [693](#)  
 Mountain Caracara [86](#) [250](#), [799](#)  
 Mountain Eagle. *See* Wedge-tailed Eagle  
 Mountain Hawk Eagle [75](#) [228](#), [775](#), [774](#). *See also* Blyth's Hawk Eagle  
 Mountain Serpent-eagle. *See* Kinabalu Serpent-eagle  
*murchisonianus*, *Falco longipennis* [262](#), [889](#)
- Nankeen Kestrel. *See* Australian Kestrel  
*nanus*, *Accipiter* [162](#), [568](#)  
*nanus*, *Spizetus* [229](#), [783](#)  
*nanus*, *Spizetus nanus* [784](#)  
*nasa*, *Micrastur semitorquatus* [258](#), [822](#)  
*natalis*, *Accipiter hircaster* [544](#)  
*nattervi*, *Buteo magnirostris* [650](#)  
 Natuna Serpent-eagle [26](#) [130](#), [465](#)  
*naturensis*, *Spilornis* [190](#), [465](#)  
*naumanni*, *Falco* [266](#), [834](#)  
*negrensis*, *Argypius trichobolus* [124](#), [441](#)  
 Neglected Kestrel. *See* Common Kestrel  
*neglectus*, *Falco tinnunculus* [264](#), [847](#)  
*newtoni*, *Falco peregrinus* [917](#)  
 New Britain Buzzard. *See* Black Honey-buzzard  
 New Britain Goshawk [45](#) [168](#), [556](#)  
 New Britain Grey-headed Goshawk. *See* New Britain Goshawk  
 New Britain Honey-buzzard. *See* Black Honey-buzzard  
 New Britain Sparrowhawk [45](#) [168](#), [571](#)  
 New Caledonia Goshawk [45](#) [168](#), [550](#)  
 New Guinea Eagle [74](#) [226](#), [720](#)  
 New Guinea Goshawk. *See* Grey-headed Goshawk  
 New Guinea Grey-headed Goshawk. *See* Grey-headed Goshawk  
 New Guinea Harpy Eagle. *See* New Guinea Eagle  
 New Zealand Falcon [104](#) [286](#), [893](#)  
*newtoni*, *Falco* [270](#), [848](#)  
*newtoni*, *Falco newtoni* [849](#)  
 Newton's Kestrel. *See* Malagasy Spotted Kestrel  
 Nias Serpent-eagle [26](#) [130](#), [463](#)  
*niasensis*, *Accipiter tringatus* [519](#)  
*nicaraguensis*, *Falco sparverius* [842](#)  
 Nicobar Crested Serpent-eagle. *See* Central Nicobar Serpent-eagle  
 Nicobar Serpent-eagle. *See* Great Nicobar Serpent-eagle  
 Nicobar Shukra. *See* Nicobar Sparrowhawk  
 Nicobar Sparrowhawk [41](#) [160](#), [531](#)  
 'niger', *Halastur pelagicus* [112](#)  
*nigra*, *Certhiospiza caeruleiventris* [186](#), [617](#)  
*nigricollis*, *Buzarellus* [196](#), [639](#)  
*nigricollis*, *Buzarellus nigricollis* [640](#)  
*nipalensis*, *Aquila* [298](#), [733](#)  
*nipalensis*, *Aquila nipalensis* [736](#)  
*nipalensis*, *Spizetus* [228](#), [774](#)  
*nipalensis*, *Spizetus nipalensis* [776](#)  
*nissodes*, *Accipiter virgatus* [567](#)  
*nissomialis*, *Accipiter nissus* [581](#)  
*nissus*, *Accipiter* [156](#), [528](#)  
*nissus*, *Accipiter nissus* [581](#)  
*nitidus*, *Buteo* [200](#), [646](#)  
*nitidus*, *Buteo nitidus* [648](#)  
*nyhera*, *Aviceda subernata* [96](#), [327](#)  
 North American Harrier. *See* Northern Harrier  
 Northern Goshawk [38](#) [156](#), [591](#)  
 Northern Harrier [38](#) [156](#), [483](#). *See also* Hen Harrier  
 Northern Hobby [101](#) [280](#), [881](#)  
 Northern Marsh Harrier [32](#) [142](#), [498](#)  
 Northern Sparrowhawk [38](#) [156](#), [578](#)  
*novaeangliae*, *Harpagus* [226](#), [720](#)  
*novaezelandiae*, *Accipiter* [122](#), [540](#)  
*novaezeelandiae*, *Falco* [286](#), [893](#)  
 Nubian Vulture. *See* Lappet-faced Vulture
- obovatus*, *Accipiter griseogularis* [546](#)  
*obovatus*, *Falco tinnunculus* [264](#), [847](#)  
*obscura*, *Aviceda subernata* [327](#)  
*obsoletus*, *Accipiter butleri* [160](#), [534](#)  
*occidentalis*, *Lurupharnx* [190](#), [626](#)  
*occidens*, *Buteo magnirostris* [200](#), [650](#)  
*occipitalis*, *Aegypius* [124](#), [442](#)  
*occipitalis*, *Lophotus* [246](#), [762](#)  
*ochraceus*, *Falco sparverius* [274](#), [842](#)  
*obryz*, *Micrastur ruficollis* [815](#)  
 Orange-breasted Falcon [105](#) [288](#), [922](#)  
*oreophilus*, *Buteo* [220](#), [693](#)  
*oreophilus*, *Buteo oreophilus* [695](#)  
 Oriental Hobby [101](#) [280](#), [886](#)  
 Oriental Honey-buzzard. *See* Eastern Honey-buzzard  
*orientalis*, *Aquila nipalensis* [298](#), [736](#)  
*orientalis*, *Pernis ptilorhynchus* [98](#), [345](#)  
*orientalis*, *Spizetus nipalensis* [228](#), [776](#)  
 Ornate Hawk Eagle [73](#) [224](#), [786](#)  
*ornatus*, *Spizetus* [224](#), [786](#)  
*ornatus*, *Spizetus ornatus* [788](#)  
*oshima*, *Buteo buteo* [693](#)  
 Osprey [6](#) [90](#), [317](#)  
 Oxifrage. *See* Lammergeier  
 Osambo Sparrowhawk [45](#) [148](#), [515](#), [575](#)

- ovampensis, *Accipiter* [148](#), [575](#)  
 Ovambo Sparrowhawk. *See* Ovambo Sparrowhawk
- Pacific Baza [2](#) [96](#), [325](#)  
 Pacific Black Hawk. *See* Mangrove Black Hawk  
 Pacific Marsh Harrier. *See* Australasian Marsh Harrier  
 Pacific Sea Eagle. *See* Steller's Fish-eagle  
*pacificus*, *Falco columbarius* [880](#)  
*palauanensis*, *Pernis ptilorhynchus* [345](#)  
*palauanensis*, *Spilornis cheela* [459](#)  
*palawanus*, *Accipiter trivirgatus* [519](#)  
 Pale Chanting-goshawk [54](#) [146](#), [512](#). *See also* Eastern Chanting-goshawk  
 Pale Harrier. *See* Pallid Harrier  
 Pallas's Fish-eagle [18](#) [114](#), [398](#)  
 Pallid Harrier [31](#) [140](#), [488](#)  
 Pallid Merlin. *See* Merlin  
*pallida*, *Aviceda subcristata* [327](#)  
*pallidiceps*, *Accipiter hiogaster* [172](#), [544](#)  
*pallidimanus*, *Accipiter hiogaster* [544](#)  
*pallidus*, *Buteo nitidus* [208](#), [648](#)  
*pallidus*, *Caracara plancus* [806](#)  
*pallidus*, *Falco columbarius* [290](#), [880](#)  
*pallidus*, *Spilornis cheela* [459](#)  
 Palmnut Vulture [16](#) [110](#), [411](#)  
 Pandionidae [317](#)  
*papa*, *Sarcoramphus* [88](#), [315](#)  
 Papuan (Marsh) Harrier. *See* Australasian Marsh Harrier  
 Papuan Goshawk. *See* Meyer's Goshawk  
 Papuan Honey-buzzard. *See* Long-tailed Honey-buzzard  
*papuanus*, *Accipiter cirrhocephalus* [174](#), [571](#)  
*papuanus*, *Falco severus* [280](#), [887](#)  
*papuanus*, *Macheiramphus olcinus* [332](#)  
 Papuasian Goshawk. *See* Varied Goshawk  
*parasitus*, *Micrus migrans* [92](#), [385](#)  
 Pariah Indian Kite. *See* Black Kite  
 Patagonian Red-tailed Hawk. *See* Rufous-tailed Hawk  
*paulus*, *Falco sparverius* [274](#), [842](#)  
*pauci*, *Falco peregrinus* [300](#), [302](#), [917](#)  
 Pearl Kite [14](#) [106](#), [352](#)  
*pectoralis*, *Circus* [126](#), [450](#)  
*pectoralis*, *Polyboroides typus* [134](#), [476](#)  
*pelagicus*, *Haliaeetus* [112](#), [406](#)  
*pelegrinoides*, *Falco* [298](#), [919](#)  
*pelegrinoides*, *Falco pelegrinoides* [922](#)  
*pembuensis*, *Accipiter tachiro* [523](#)  
*peninsularis*, *Accipiter trivirgatus* [519](#)  
*peninsularis*, *Falco sparverius* [274](#), [842](#)  
*pennatus*, *Hieranetus* [244](#), [758](#)  
*percnopterus*, *Neophron* [116](#), [417](#)  
*percnopterus*, *Neophron percnopterus* [420](#)  
*peregrinator*, *Falco peregrinus* [300](#), [302](#), [917](#)  
 Peregrine. *See* Peregrine Falcon  
 Peregrine Falcon [111/112](#) [300](#), [302](#), [911](#)  
*peregrinus*, *Falco* [300](#), [302](#), [911](#)  
*peregrinus*, *Falco peregrinus* [917](#)  
*perniger*, *Ictinornis malayensis* [226](#), [724](#)  
*perobcurus*, *Accipiter striatus* [585](#)  
*perplexus*, *Spilornis* [130](#), [470](#)  
*perspicillaris*, *Accipiter rufiventris* [583](#)  
*peruvianus*, *Falco sparverius* [842](#)  
*petrophilus*, *Falco rufigularis* [288](#), [891](#)  
*petulans*, *Buteo magnirostris* [200](#), [650](#)  
*philippinus*, *Pernis ptilorhynchus* [98](#), [345](#)  
*philippinus*, *Spizaetus* [232](#), [779](#)  
*philippinus*, *Spizaetus philippinus* [781](#)  
 Philippine Eagle [74](#) [226](#), [721](#)  
 Philippine Falconet [92](#) [262](#), [831](#)  
 Philippine Hawk Eagle [77](#) [232](#), [779](#)  
 Philippine Serpent-eagle [27](#) [152](#), [469](#)  
*pichinchar*, *Falco femoralis* [288](#), [876](#)  
 Pied Falconet [92](#) [262](#), [831](#)  
 Pied Goshawk [46](#) [170](#), [547](#)  
 Pied Harrier [33](#) [141](#), [491](#)  
 Pied Hawk Sparrowhawk. *See* Pied Goshawk  
 Pigeon Hawk. *See* Merlin  
*pileatus*, *Accipiter bicolor* [178](#), [588](#)  
*pileatus*, *Necrosyrtes monarchus* [422](#)  
*pinsheri*, *Spizaetus philippinus* [781](#)  
*plagiatus*, *Buteo nitidus* [208](#), [648](#)  
 Plain-breasted Hawk. *See* Sharp-shinned Hawk  
*plancus*, *Caracara* [252](#), [804](#)  
*plancus*, *Caracara plancus* [805](#)  
*platypterus*, *Buteo* [208](#), [656](#)  
*platypterus*, *Buteo platypterus* [652](#)  
*plumbea*, *Ichthyophaga humilis* [402](#)  
*plumbea*, *Ictinia* [104](#), [369](#)  
*plumbea*, *Leucopternis* [186](#), [618](#)  
 Plumbeous Forest-falcon [89](#) [256](#), [817](#)  
 Plumbeous Hawk [54](#) [186](#), [618](#)  
 Plumbeous Kite [13](#) [104](#), [369](#)  
*plumbeus*, *Micrastur* [256](#), [817](#)  
*plumbeus*, *Rosthamus sociabilis* [365](#)  
*porilochinus*, *Buteo* [202](#), [674](#)  
*porocephalus*, *Accipiter* [166](#), [555](#)  
*porogaster*, *Accipiter* [180](#), [516](#)  
*poronota*, *Leucopternis* [180](#), [627](#)  
*poronotus*, *Accipiter hiogaster* [544](#)  
*poropus*, *Accipiter badius* [148](#), [528](#)  
*poropterus*, *Melanerax* [146](#), [511](#)  
*porocryptus*, *Accipiter fuscatus* [539](#)  
*polyzona*, *Buteo* [202](#), [671](#)  
*polyzonoides*, *Accipiter badius* [148](#), [528](#)  
*pomarina*, *Aquila* [240](#), [724](#)  
*pomarina*, *Aquila pomarina* [722](#)  
 Prairie Falcon [108](#) [254](#), [896](#)  
 Prairie Merlin. *See* Merlin  
 Prince/Prince's Hawk. *See* Barred Hawk  
*princeps*, *Accipiter* [168](#), [556](#)  
*princeps*, *Leucopternis* [186](#), [619](#)  
*proxima*, *Aviceda subcristata* [327](#)  
*ptilorhynchus*, *Pernis* [98](#), [342](#)  
*ptilorhynchus*, *Pernis ptilorhynchus* [345](#)  
*pucherani*, *Buteo magnirostris* [200](#), [650](#)  
*pulchellus*, *Accipiter hiogaster* [544](#)  
 Puna Hawk. *See* Gurney's Hawk  
*punctatus*, *Falco* [270](#), [849](#)  
*punicus*, *Accipiter nisus* [581](#)  
*pusillus*, *Accipiter francesii* [154](#), [536](#)  
*pygargus*, *Circus* [140](#), [493](#)  
 Pygmy Falcon. *See* African Pygmy-falcon
- quercitandus*, *Accipiter cirrhocephalus* [174](#), [571](#)  
*quagga*, *Accipiter virgatus* [567](#)  
*quinquefasciatus*, *Accipiter virgatus* [567](#)
- radama*, *Falco peregrinus* [300](#), [917](#)  
*radiatus*, *Erythrotriorchis* [174](#), [603](#)  
*radiatus*, *Polyboroides* [134](#), [476](#)  
*rannivorus*, *Circus* [138](#), [496](#)  
*rapax*, *Aquila* [238](#), [730](#)  
*rapax*, *Aquila rapax* [733](#)  
 Red Goshawk. *See* Red Hawk  
 Red Hawk [48](#) [174](#), [603](#)  
 Red Kite [7](#) [92](#), [376](#)  
 Red-backed Buzzard. *See* Red-backed Hawk

Red-backed Hawk **62** [202](#), [665](#), [671](#), [708](#)  
 Red-backed Kite/Fish-/Sea-eagle. *See* Brahminy Kite  
 Red-bellied Hawk. *See* Red-shouldered Hawk  
 Red-breasted Falconet. *See* Collared Falconet  
 Red-breasted Goshawk. *See* African Goshawk  
 Red-breasted Sparrowhawk. *See* Rufous-breasted Sparrowhawk  
 Red-capped Falcon. *See* Barbary Falcon  
 Red-chested Goshawk. *See* African Goshawk  
 Red-footed Falcon. *See* Western Red-footed Falcon  
 Red-headed Falcon **104** [286](#), [362](#)  
 Red-headed Merlin. *See* Red-headed Falcon  
 Red-headed Turuntii. *See* Red-headed Falcon  
 Red-headed Vulture **21** [120](#), [443](#)  
 Red-legged Falconet. *See* Collared Falconet  
 Red-naped Falcon. *See* Barbary Falcon  
 Red-necked Buzzard **70** [218](#), [710](#)  
 Red-necked Falcon. *See* Red-headed Falcon  
 Red-shouldered Buzzard. *See* Red-shouldered Hawk  
 Red-shouldered Hawk **67** [212](#), [653](#), [665](#)  
 Red-tailed Buzzard. *See* Red-necked Buzzard; Red-tailed Hawk; Rufous-tailed Hawk  
 Red-tailed Hawk **67** [212](#), [665](#), [681](#), [707](#)  
 Red-thighed Falconet. *See* Collared Falconet  
 Red-thighed Little Sparrowhawk. *See* Red-thighed Sparrowhawk  
 Red-thighed Sparrowhawk **36** [150](#), [560](#)  
 Red-throated Caracara **88** [251](#), [292](#)  
*rufectus*, *Buteo buteo* [693](#)  
*regalis*, *Buteo* [210](#), [702](#)  
*reinwardtii*, *Aviceda subcristata* [327](#)  
*renschii*, *Hieruastus fasciatus* [244](#), [753](#)  
 Reunion (Marsh) Harrier. *See* Malagasy Marsh Harrier  
*rhodogaster*, *Accipiter* [162](#), [573](#)  
*rhodogaster*, *Accipiter rhodogaster* [573](#)  
*richardsoni*, *Falco columbarius* [250](#), [380](#)  
*richmondi*, *Spilornis cheela* [130](#), [459](#)  
*richetti*, *Spilornis cheela* [459](#)  
*ridgwayi*, *Buteo* [198](#), [652](#)  
*ridgwayi*, *Buteogallus urubitinga* [192](#), [634](#)  
*ridgwayi*, *Pandion haliaetus* [320](#)  
 Ridgway's Buzzard. *See* Ridgway's Hawk  
 Ridgway's Hawk **60** [198](#), [652](#)  
 Ring-tailed Fishing-eagle. *See* Pallas's Fish-eagle  
*rosouri*, *Chelictinia* [91](#), [362](#)  
 River Eagle. *See* African Fish-eagle  
*rosei*, *Buteo platypterus* [659](#)  
 Roadside Buzzard. *See* Roadside Hawk  
 Roadside Hawk **61** [200](#), [648](#), [658](#)  
*robusta*, *Aviceda subcristata* [327](#)  
 Rock Kestrel. *See* Common Kestrel  
*rostratus*, *Accipiter cirrhocephalus* [571](#)  
 Rough-legged Buzzard **68** [214](#), [665](#), [708](#)  
 Rough-legged Hawk. *See* Rough-legged Buzzard  
*rubinus*, *Accipiter hughaster* [544](#)  
*rupestris*, *Cyprip* [122](#), [428](#)  
*rupestris*, *Cyprip rupestris* [429](#)  
*rufa*, *Aviceda subcristata* [96](#)  
*rufescens*, *Falco tinnunculus* [264](#), [847](#)  
*ruficollis*, *Cathartes aura* [86](#), [308](#)  
*ruficollis*, *Falco chicquera* [286](#), [864](#)  
*ruficollis*, *Micrastur* [256](#), [813](#)  
*ruficollis*, *Micrastur ruficollis* [813](#)  
*ruficollis*, *Prernis ptilorhynchus* [98](#), [345](#)  
*rufigularis*, *Falco* [288](#), [889](#)  
*rufinus*, *Buteo* [218](#), [696](#)  
*rufinus*, *Buteo rufinus* [700](#)  
*rufipectus*, *Spilornis* [132](#), [468](#)

*rufipectus*, *Spilornis rufipectus* [469](#)  
*rufipennis*, *Motastur* [182](#), [608](#)  
*rufitorques*, *Accipiter* [164](#), [549](#)  
*rufiventris*, *Accipiter* [148](#), [581](#)  
*rufiventris*, *Accipiter rufiventris* [583](#)  
*rufosuscia*, *Buteo* [220](#), [712](#)  
*rufoschistaceus*, *Accipiter hughaster* [172](#), [544](#)  
*rufotibialis*, *Accipiter virgatus* [567](#)  
 Rufous Crab-hawk **57** [192](#), [628](#)  
 Rufous Sparrowhawk. *See* Rufous-breasted Sparrowhawk  
 Rufous-backed Kite/Fish-/Sea-eagle. *See* Brahminy Kite  
 Rufous-bellied Eagle. *See* Rufous-bellied Hawk Eagle  
 Rufous-bellied Hawk Eagle **76** [250](#), [765](#)  
 Rufous-breasted Hawk/Goshawk. *See* Varied Goshawk  
 Rufous-breasted Sparrowhawk **35** [148](#), [581](#)  
 Rufous-chested Sparrowhawk. *See* Rufous-breasted Sparrowhawk  
 Rufous-necked Sparrowhawk. *See* Moluccan Sparrowhawk  
 Rufous-tailed Buzzard. *See* Rufous-tailed Hawk  
 Rufous-tailed Hawk **63** [204](#), [665](#), [672](#), [708](#)  
 Rufous-thighed Hawk. *See* Sharp-shinned Hawk; White-rumped Hawk  
 Rufous-thighed Kite **14** [106](#), [368](#)  
 Rufous-winged Buzzard-eagle. *See* Rufous-winged Buzzard-hawk  
 Rufous-winged Buzzard-hawk **53** [184](#), [602](#)  
*rupicolaeformis*, *Falco tinnunculus* [847](#)  
*rupicoloides*, *Falco* [266](#), [855](#)  
*rupicoloides*, *Falco rupicoloides* [857](#)  
*rupicolus*, *Falco tinnunculus* [264](#), [847](#)  
 Rüppell's Griffon. *See* Rüppell's Vulture  
 Rüppell's Vulture **22** [122](#), [428](#)  
*rusticolus*, *Falco* [296](#), [918](#)  
*rutherfordi*, *Spilornis cheela* [459](#)  
 Ryukyu Crested Serpent-eagle. *See* Ryukyu Serpent-eagle  
 Ryukyu Serpent-eagle **26** [130](#), [470](#)

#### Sagittariidae 794

#### Sagittariiformes 794

#### Saker. *See* Saker Falcon

#### Saker Falcon **108** [294](#), [903](#)

#### *sanctijohannis*, *Buteo lagopus* [214](#), [710](#)

#### *sanfordi*, *Haliaeetus* [108](#), [393](#)

#### Sanford's Fish-eagle **15** [108](#), [393](#)

#### Sanford's Sea-eagle. *See* Sanford's Fish-eagle

#### *saturatus*, *Buteo magnirostris* [200](#), [650](#)

#### Savannah Hawk **59** [196](#), [635](#)

#### Savannah Vulture. *See* Lesser Yellow-headed Vulture

#### *savi*, *Accipiter fasciatus* [532](#)

#### *schistacea*, *Leucopternis* [186](#), [617](#)

#### *schudovani*, *Accipiter gentilis* [592](#)

#### Scissor-tailed Kite **11** [94](#), [362](#)

#### Sclater's Forest-falcon. *See* Plumbeous Forest-falcon

#### *scriptus*, *Elanus* [100](#), [360](#)

#### Sea Eagle. *See* White-tailed Fish-eagle

#### Secretarybird **85** [248](#), [294](#)

#### Semicollared Hawk **51** [180](#), [552](#)

#### Semicollared Sparrowhawk. *See* Semicollared Hawk

#### *semiplumbea*, *Leucopternis* [188](#), [623](#)

#### Semiplumbeous Hawk **55** [188](#), [623](#)

#### *semitorquatus*, *Micrastur* [258](#), [820](#)

#### *semitorquatus*, *Micrastur semitorquatus* [822](#)

#### *semitorquatus*, *Polioburax* [260](#), [823](#)

#### *semitorquatus*, *Polioburax semitorquatus* [825](#)

#### *septentrionalis*, *Cathartes aura* [86](#), [308](#)

#### *septentrionalis*, *Falco femoralis* [248](#), [876](#)

#### *serpentarius*, *Sagittarius* [248](#), [794](#)

#### *serus*, *Spizartus tyrannus* [224](#), [786](#)

*severus*, *Falco* [280](#), [886](#)  
*severus*, *Falco severus* [887](#)  
 Seychelles Kestrel [96](#) [270](#), [851](#)  
 Shaheen. *See* Barbary Falcon; Peregrine Falcon  
 Shangar. *See* Saker Falcon  
 Sharp-shinned Hawk [49](#) [176](#), [583](#)  
*sharppei*, *Accipiter albogularis* [349](#)  
 Sharpshin. *See* Sharp-shinned Hawk  
*sheffleri*, *Harpyhaliaetus solitarius* [644](#)  
 Shikra [35](#) [148](#), [524](#)  
 Shining Buzzard-hawk. *See* Grey-lined Hawk  
 Short-tailed buzzard. *See* Short-tailed Hawk  
 Short-tailed Hawk [63](#) [204](#), [658](#), [659](#)  
 Short-toed Eagle. *See* Short-toed Snake-eagle  
 Short-toed Snake-eagle [24](#) [126](#), [415](#)  
 Siberian Buzzard. *See* Common Buzzard  
 Siberian Saker. *See* Saker Falcon  
 Simalur Serpent-eagle. *See* Simeulue Serpent-eagle  
 Simeulue Serpent-eagle [26](#) [130](#), [463](#)  
*sinushonduri*, *Buteo magnirostris* [650](#)  
*sipora*, *Spilornis* [130](#), [464](#)  
 Slate-coloured Hawk [54](#) [186](#), [617](#)  
 Slaty-backed Forest-falcon [89](#) [256](#), [818](#)  
 Slaty-backed Sparrowhawk [45](#) [168](#), [552](#)  
 Slaty-mantled Goshawk. *See* Slaty-backed Sparrowhawk  
 Slender-billed Kite [12](#) [102](#), [365](#)  
 Small Hawk Eagle. *See* Wallace's Hawk Eagle  
 Small Indian Kite. *See* Black Kite  
 Small Serpent-eagle. *See* Central Nicobar Serpent-  
 Eagle; Great Nicobar Serpent-eagle  
 Smaller Banded Snake-eagle. *See* Banded Snake-eagle  
 Snail Kite [12](#) [102](#), [363](#)  
*sociabilis*, *Rostrhamus* [102](#), [363](#)  
*sociabilis*, *Rostrhamus sociabilis* [365](#)  
*sororroensis*, *Buteo jamaicensis* [685](#)  
*solitarius*, *Buteo* [198](#), [677](#)  
*solitarius*, *Harpyhaliaetus* [194](#), [642](#)  
*solitarius*, *Harpyhaliaetus solitarius* [644](#)  
 Solitary Eagle. *See* Black Solitary-eagle  
*solitudinis*, *Buteo jamaicensis* [685](#)  
*soloensis*, *Accipiter* [158](#), [531](#)  
 Solomon Fish-/Sea-eagle. *See* Sanford's Fish-eagle  
 Somali Chanting-goshawk. *See* Eastern Chanting-goshawk  
 Sooty Falcon [100](#) [278](#), [872](#)  
 Southern Banded Snake-eagle. *See* East African (Banded)  
 Snake-Eagle  
 Southern Pale Chanting-goshawk. *See* Pale Chanting-  
 goshawk  
 Spanish Imperial Eagle. *See* Imperial Eagle  
*sparsifasciatus*, *Accipiter tachiro* [152](#), [523](#)  
*sparverius*, *Falco* [274](#), [838](#)  
*sparverius*, *Falco sparverius* [842](#)  
*sparveroides*, *Falco sparverius* [274](#), [842](#)  
*spectabilis*, *Dryotriorchis* [128](#), [471](#)  
*spectabilis*, *Dryotriorchis spectabilis* [472](#)  
*sphenurus*, *Accipiter badius* [148](#), [528](#)  
*sphenurus*, *Haliaastur* [108](#), [386](#)  
*spilogaster*, *Hieraaetus* [244](#), [753](#)  
*spilogaster*, *Spilornis cheela* [130](#), [459](#)  
*spilonotus*, *Circus aeruginosus* [142](#), [502](#)  
*spilothorax*, *Circus approximans* [144](#), [505](#)  
 Spot-tailed Accipiter/Goshawk. *See* Spot-tailed Sparrowhawk  
 Spot-tailed Sparrowhawk [42](#) [162](#), [536](#)  
 Spot-winged Falconet [90](#) [258](#), [810](#)  
 Spotted Eagle. *See* Greater Spotted Eagle  
 Spotted Harrier [33](#) [141](#), [472](#)  
 Spotted Kestrel. *See* Moluccan Kestrel  
 Spotted Swamp Hawk. *See* Spotted Harrier  
 Square-tailed Kite [11](#) [100](#), [372](#)  
*storni*, *Pernis celebensis* [98](#), [348](#)  
 Steller's Fish-eagle [17](#) [112](#), [406](#)  
 Steller's Sea Eagle. *See* Steller's Fish-eagle  
*stenozona*, *Aviceda subcristata* [327](#)  
 Steppe Buzzard. *See* Common Buzzard  
 Steppe Eagle [80](#) [238](#), [733](#)  
*strichi*, *Falco subbuteo* [280](#), [894](#)  
*stresemanni*, *Accipiter fasciatus* [174](#), [539](#)  
*stresemanni*, *Aviceda subcristata* [327](#)  
*stresemanni*, *Spizaetus nanus* [228](#), [784](#)  
 Striated Caracara. *See* Forster's Caracara  
*striatus*, *Accipiter* [176](#), [583](#)  
*striatus*, *Accipiter striatus* [585](#)  
*subcaesalon*, *Falco columbarius* [880](#)  
*subbuteo*, *Falco* [280](#), [881](#)  
*subbuteo*, *Falco subbuteo* [894](#)  
*subcristata*, *Aviceda* [96](#), [325](#)  
*subcristata*, *Aviceda subcristata* [327](#)  
 'submelanogenys', *Falco peregrinus* [302](#)  
*subniger*, *Falco* [284](#), [895](#)  
*subtilis*, *Buteogallus* [192](#), [629](#)  
*suckleyi*, *Falco columbarius* [290](#), [880](#)  
*sulaensis*, *Accipiter rhodogaster* [575](#)  
*sulaensis*, *Spilornis rufipectus* [132](#), [469](#)  
 Sulawesi Crested Goshawk [41](#) [160](#), [520](#)  
 Sulawesi Dwarf/Little Sparrowhawk. *See* Sulawesi Small  
 Sparrowhawk  
 Sulawesi Goshawk. *See* Sulawesi Crested Goshawk  
 Sulawesi Hawk Eagle [77](#) [232](#), [778](#)  
 Sulawesi Serpent-eagle [27](#) [132](#), [468](#)  
 Sulawesi Small Sparrowhawk [42](#) [162](#), [568](#)  
 Sunda Hawk Eagle. *See* Changeable Hawk Eagle  
*superciliatus*, *Accipiter* [180](#), [557](#)  
*superciliatus*, *Accipiter superciliosus* [558](#)  
*suttoni*, *Accipiter striatus* [176](#), [585](#)  
*swainsoni*, *Buteo* [210](#), [663](#)  
*swainsonii*, *Gampsonyx* [106](#), [352](#)  
*swainsonii*, *Gampsonyx swainsonii* [353](#)  
 Swainson's Buzzard. *See* Swainson's Hawk  
 Swainson's Hawk [66](#) [210](#), [663](#), [708](#)  
 Swallow-tailed Kite [14](#) [106](#), [348](#)  
 Swamp Harrier/Hawk. *See* Australasian Marsh Harrier  
*syama*, *Aviceda leucophotes* [96](#), [329](#)  
*ylvestris*, *Accipiter hiogaster* [172](#), [544](#)  
  
*tachiro*, *Accipiter* [152](#), [521](#)  
*tachiro*, *Accipiter tachiro* [523](#)  
 Taiga Merlin. *See* Merlin  
 Taita Falcon [110](#) [298](#), [924](#)  
 Tank Eagle. *See* Grey-headed Fishing-eagle  
*tanypterus*, *Falco biarmicus* [902](#)  
 Tawny Eagle [80](#) [238](#), [730](#), [734](#)  
*teesa*, *Buteo* [184](#), [610](#)  
 Teita Falcon. *See* Taita Falcon  
*temminckii*, *Accipiter melanoleucus* [152](#), [594](#)  
*temucoensis*, *Milvago chimango* [252](#), [809](#)  
*tennistris*, *Cypselurus indicus* [120](#), [428](#)  
*texanus*, *Buteo lineatus* [656](#)  
*theresae*, *Melierax metabates* [510](#)  
*timorensis*, *Falco moluccensis* [272](#), [853](#)  
*timorlaensis*, *Aviceda subcristata* [327](#)  
*tinnunculus*, *Falco* [264](#), [843](#)  
*tinnunculus*, *Falco tinnunculus* [847](#)  
 Tiny Hawk [51](#) [180](#), [557](#)  
 Tiny Sparrowhawk. *See* Tiny Hawk  
*tjendanae*, *Accipiter fasciatus* [539](#)  
*torquatus*, *Pernis ptilorhynchus* [345](#)

*toussenelii*, *Accipiter tachiro* [98](#), [523](#)  
*toyoshimai*, *Buteo buteo* [693](#)  
*tracheliotus*, *Aegyptius* [124](#), [439](#)  
*tracheliotus*, *Aegyptius tracheliotus* [441](#)  
 Traylor's Forest-falcon. *See* Buckley's Forest-falcon  
*trinotatus*, *Accipiter* [162](#), [536](#)  
*trivirgatus*, *Accipiter* [160](#), [518](#)  
*trivirgatus*, *Accipiter trivirgatus* [519](#)  
*trizonatus*, *Buteo orophilus* [220](#), [695](#)  
 Tropical Broad-winged Hawk. *See* Roadside Hawk  
*tropicalis*, *Falco sparverius* [842](#)  
*tundrius*, *Falco peregrinus* [917](#)  
 Turkey Buzzard. *See* Turkey Vulture  
 Turkey Vulture [4](#) [86](#), [306](#), [676](#)  
*typus*, *Polyboroides* [131](#), [474](#)  
*typus*, *Polyboroides typus* [476](#)  
*tyrannus*, *Spizaetus* [784](#)  
*tyrannus*, *Spizaetus tyrannus* [786](#)  
*tyrannus*, *Spizastur* [224](#)  
 Tyrant Hawk Eagle. *See* Black Hawk Eagle  
  
*umbrinus*, *Buteo jamaicensis* [685](#)  
*uncinatus*, *Chondrohierax* [102](#)  
*uncinatus*, *Chondrohierax uncinatus* [334](#)  
*unduliventer*, *Accipiter tachiro* [523](#)  
*unicinctus*, *Parabuteo* [196](#), [636](#)  
*unicinctus*, *Parabuteo unicinctus* [638](#)  
 Upland Buzzard [68](#) [214](#), [700](#)  
*urubitinga*, *Buteogallus* [192](#), [632](#)  
*urubitinga*, *Buteogallus urubitinga* [634](#)  
  
*vanbenneveli*, *Accipiter virgatus* [158](#), [567](#)  
*vanheurni*, *Spizaetus cirrhatus* [290](#), [774](#)  
 Variable Goshawk. *See* Varied Goshawk  
 Variable Hawk. *See* Gurney's Hawk  
 Varied Goshawk [47](#) [172](#), [541](#)  
*velox*, *Accipiter striatus* [176](#), [585](#)  
*venator*, *Accipiter striatus* [585](#)  
*ventralis*, *Accipiter striatus* [176](#), [585](#)  
*ventralis*, *Buteo* [204](#), [679](#)  
*verreauxi*, *Aviceda curuloides* [94](#), [322](#)  
*verreauxii*, *Aquila* [242](#), [748](#)  
 Verreaux's Eagle [82](#) [242](#), [748](#)  
*vespertinus*, *Falco* [276](#), [864](#)  
*vicarius*, *Spizaetus ornatus* [788](#)  
*vigilax*, *Accipiter fasciatus* [539](#)  
*vindhiana*, *Aquila rapax* [238](#), [733](#)  
 Vinous-breasted Sparrowhawk [42](#) [162](#), [573](#)  
 Vinous-chested Hawk/Goshawk. *See* Varied Goshawk  
*virgatus*, *Accipiter* [158](#), [565](#)  
*virgatus*, *Accipiter virgatus* [567](#)  
*vocifer*, *Haliaeetus* [110](#), [394](#)  
*vociferoides*, *Haliaeetus* [110](#), [396](#)  
*vulpinus*, *Buteo buteo* [216](#), [692](#)  
 Vulturine Fish-eagle. *See* Palmnut Vulture  
  
*wahgenensis*, *Elanus cinereus* [358](#)  
*wahlbergi*, *Hieronotus* [242](#), [755](#)  
 Wahlberg's Eagle [82](#) [242](#), [755](#)  
*waiguanensis*, *Aviceda suberistata* [327](#)  
*wallacii*, *Accipiter fasciatus* [174](#), [539](#)  
 Wallace's Hawk Eagle [75](#) [228](#), [783](#)  
 Wedge-tailed Eagle [78](#) [234](#), [746](#)  
*weiskei*, *Hieronotus morphnoides* [234](#), [763](#)  
 West African Goshawk. *See* African Goshawk  
 West African Serpent-eagle [25](#) [128](#), [471](#)  
 Western Banded Snake-eagle. *See* Banded Snake-eagle  
 Western Honey-buzzard [6](#) [90](#), [336](#)

Western Little Sparrowhawk. *See* Red-thighed Sparrowhawk  
 Western Marsh Harrier. *See* Northern Marsh Harrier  
 Western Red-footed Falcon [99](#) [276](#), [864](#)  
 Whistling Eagle. *See* Whistling Kite  
 Whistling Eagle/Kite. *See* Brahminy Kite  
 Whistling Hawk. *See* Whistling Kite  
 Whistling Kite [15](#) [108](#), [386](#)  
 White Goshawk. *See* Grey Goshawk  
 White Hawk [56](#) [190](#), [624](#)  
 White Scavenger Vulture. *See* Egyptian Vulture  
 White-backed Vulture [22](#) [122](#), [425](#)  
 White-bellied Fish-eagle [15](#) [108](#), [390](#)  
 White-bellied Goshawk/Sparrowhawk. *See* New Caledonia Goshawk  
 White-bellied Hawk. *See* Sharp-shinned Hawk  
 White-bellied Sea-eagle. *See* White-bellied Fish-eagle  
 White-breasted Goshawk/Sparrowhawk. *See* New Caledonia Goshawk  
 White-breasted Fish-eagle/Fish-hawk. *See* White-bellied Fish-eagle  
 White-breasted Goshawk. *See* New Britain Goshawk  
 White-browed Hawk [55](#) [188](#), [621](#)  
 White-collared Kite. *See* Forbes's Kite  
 White-eyed Buzzard-hawk [53](#) [184](#), [610](#)  
 White-eyed Buzzard/-eagle. *See* White-eyed Buzzard-hawk  
 White-eyed Kestrel [94](#) [266](#), [855](#)  
 White-fronted Falconet [91](#) [260](#), [829](#)  
 White-headed Eagle/Fish-eagle. *See* Bald Eagle  
 White-headed Kite/Fish-/Sea-eagle. *See* Brahminy Kite  
 White-headed Sea Eagle. *See* Bald Eagle  
 White-headed Vulture [23](#) [124](#), [442](#)  
 White-legged Falconet. *See* Pied Falconet  
 White-necked Hawk [55](#) [188](#), [622](#)  
 White-rumped Buzzard. *See* White-rumped Hawk  
 White-rumped Falcon. *See* White-rumped Pygmy-falcon  
 White-rumped Hawk [61](#) [200](#), [650](#), [661](#)  
 White-rumped Kestrel. *See* Dickinson's Kestrel  
 White-rumped Pygmy-falcon [91](#) [260](#), [825](#)  
 White-rumped Vulture [21](#) [120](#), [422](#)  
 White-shouldered Sea Eagle. *See* Steller's Fish-eagle  
 White-tailed Buzzard. *See* White-tailed Hawk  
 White-tailed Eagle. *See* White-tailed Fish-eagle  
 White-tailed Fish-eagle [17](#) [112](#), [402](#)  
 White-tailed Hawk [64](#) [206](#), [646](#), [665](#), [668](#), [708](#)  
 White-tailed Kite [12](#) [102](#), [353](#)  
 White-tailed Sea Eagle. *See* White-tailed Fish-eagle  
 White-throated Buzzard. *See* White-throated Hawk  
 White-throated Caracara. *See* Darwin's Caracara  
 White-throated Goshawk. *See* Pied Goshawk  
 White-throated Hawk [63](#) [204](#), [662](#)  
*wileyi*, *Accipiter gundlachi* [178](#), [592](#)  
*williaminae*, *Leucopternis albicollis* [190](#), [625](#)  
*wilsonii*, *Chondrohierax uncinatus* [102](#), [334](#)  
*wolterstorffi*, *Accipiter nisus* [156](#), [581](#)  
*woodfordi*, *Accipiter albogularis* [170](#), [549](#)  
 Woodland Buzzard. *See* Mountain Buzzard  
  
 Yellow-billed Kite. *See* Black Kite  
 Yellow-headed Caracara [87](#) [252](#), [806](#)  
 Yellow-headed Vulture. *See* Lesser Yellow-headed Vulture  
 Yellow-throated Caracara. *See* Black Caracara  
*yetapa*, *Elanoides forficatus* [106](#), [342](#)  
  
*zenkeri*, *Accipiter erythropus* [150](#), [561](#)  
 Zone-tailed Buzzard. *See* Zone-tailed Hawk  
 Zone-tailed Hawk [64](#) [206](#), [675](#), [708](#)  
*zoniventris*, *Falco* [268](#), [861](#)  
*zonothorax*, *Micrastur ruficollis* [256](#), [815](#)

**James Ferguson-Lees** has been fascinated by raptors since the late 1940s when he studied their sexual dimorphism and set up and organized a Peregrine Falcon survey in the UK. Travel in five continents has given him in-depth experience of many species. He coorganized a raptor conference at Caen in 1964, which led to the founding of the World Working Group on Birds of Prey. He has been editor of *British Birds*, president of the British Trust for Ornithology, a committee chairman and deputy director of the RSPB, and a council member and Records Committee chairman of the British Ornithologists' Union. Books have included *The Shell Guide to the Birds of Britain and Ireland* (1983) and *Endangered Birds* (1992); and he was one of the original planners of *The Birds of the Western Palearctic*, continuing as co-editor of the first volume (1977). He also chaired the working groups behind the British and Irish bird atlases that plotted breeding (1976) and wintering (1986) distributions: for the first of these he received the British Trust for Ornithology's Tucker Medal.

**David A. Christie** has been an avid birdwatcher since boyhood. He became assistant editor of *British Birds* in 1973 and still holds this post. He has wide-ranging ornithological interests, from raptors and waterbirds to woodpeckers and warblers, and has contributed numerous articles to a variety of magazines. He is also co-author of a number of books, including the award-winning *Woodpeckers* (1995).

**Kim Franklin**, now resident in Australia, has provided artwork for *The Birds of the Western Palearctic*, *Parrots* (1998), *Birds of the Indian Subcontinent* (1998), and *Shrikes and Bush-shrikes* (2000). He has exhibited paintings in the UK and Europe.

**David Mead** is a freelance artist and illustrator. He has contributed to a wide range of books and periodicals. He exhibits regularly and is noted for his meticulous attention to detail. His special interest is in *Accipiter* hawks, and his work on this book has enabled him to broaden his study of this genus.

**Philip Burton** is a well-known author and artist. In 1967 he became a principal scientific officer at the British Museum (Natural History) at Tring, working in the ornithology sub-department. He is co-author of *A Field Guide to the Waders of Britain and Europe* (1988), and his plates have been used extensively in *The Birds of the Western Palearctic*.



- Comprehensive coverage of all 313 of the world's raptor species
- Authoritative text, detailing all aspects of distribution, habitat, voice, food, and breeding biology, with full, up-to-date references
- Over 2,115 original color illustrations (1,135 in flight), depicting adult, juvenile and immature plumages, as well as main races and color morphs
- All 78 genera illustrated in flight and drawn to scale on three introductory plates
- Concise captions opposite each color plate, summarizing key information and identification pointers
- Text enhanced throughout with line drawings illustrating specific aspects of identification and behavior
- Clear color distribution map for each species

